VOL. XVIII, No. 20 CHICAGO, NOVEMBER 17, 1910 $3.00 PER YEAR

MOTOR AGE

Grand Prix to Bruce-Brown in Benz

SAVANNAH, GA., Nov. 12—Furnishing the most thrilling and dramatic finish in the world's history of motor races and setting a new American road record of 70.28 miles per hour for a distance of 415.2 miles, David Bruce-Brown, driving a 920-cubic-inch displacement Benz, won the grand prix today, defeating Victor Hemery, in a 736-cubic-inch displacement Benz by 1.42 second. Bob Burman, in a Marquette-Buick, was third; Ralph Mulford, in a Lozier, fourth; Joe Horan, in a Lozier six-cylinder, fifth, and Joe Dawson, in a Marmon, sixth—the only cars out of the fifteen that started to finish.

Probably never before and perhaps never again will there be such a spectacle as was presented at the finish of this classic. For nearly 100 miles but a few seconds separated de Palma, Hemery and Brown, and when de Palma dropped and it was seen that one of the two Benz drivers would win, it seemed as if the thousands in the stands would work themselves into a veritable frenzy from nervous excitement. And when Hemery crossed the wire first a mighty shout went up, for most of the spectators thought he had won. The announcement immediately following that if Brown did not cross within 3 minutes, the time he still had on account of the starting handicap, Hemery would be the winner, only served to intensify the situation. The announcers began to toll off the seconds. Five, 10, 15—and then, before another count could be announced, came the cry, "No. 15! Car is in the stretch!" As one man, the throng rose in its seats,

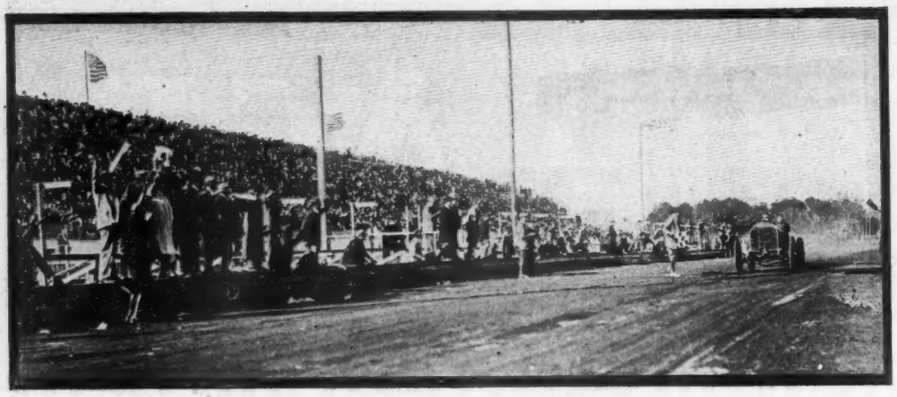
SAVANNAH RESULTS

Grand Prix, distance 415.2 miles—Won by David Bruce-Brown, in Benz; 70.28 miles per hour.

Savannah Cup, for 231-300 class; distance 276.8 miles—Won by Joe Dawson, in Marmon; 62.75 miles per hour.

Tiedeman Trophy, for 161-230 class; distance 190.3 miles — Won by William Knipper, Lancia; average 57.27 miles per hour.

DAVID BRUCE-BROWN, HERO OF GRAND PRIX—WINNING BENZ AT THE PITS



BROWN TRAVELING AT SPEED DOWN THE HOME STRETCH

craning necks to catch the first glance of the flying Brown as he came into sight up the Dale avenue stretch. Twenty, 25, went the count, and then—well, mere words fail. Like the roar of a giant disappearing gun was the one shout in unison as the crowd saw his car loom up far down the stretch. And then began the real thrilling incidents. Men yelled and jumped and coaxed—women screamed and waved handkerchiefs and umbrellas, all, everybody, begging him to come. Even the staid officials, used to thrilling scenes, forgot themselves and yelled and danced all the while Brown was coming nearer and nearer, while the fleeting seconds were cutting down his lead. Would he make it? A throb went through everybody as he neared the right-angle turn at Dale avenue and Waters road, which separated him from the line by but a few hundred feet, for he slowed down perceptibly. But he was only playing safe. Hugging the inside of the road closely, he shut down to a mere crawl until half around, and then, opening his giant motor wide, he fairly flew across the finish wire in 5 hours, 53 minutes, 5.35 seconds—winner by a second and less than a half of the greatest race ever held in any country.

Crowds Cheer Madly

Long after the sound of Brown's exhaust had died out far down the road the people stood and cheered—cheered until it seemed as if they must stop from sheer exhaustion—then they settled down, only to wait a few moments for Brown to come back the turn back another road and drive up between the pits at the grand stand, where all finishing cars were to come. Of course Hemery was greeted heartily when he first took this position, but Brown's reception as he slowly drove up was second only in volume to the greetings as he won the race. It was a tribute to an American driver, notwithstanding he drove a foreign car. His mother was first to reach him and congratulate him.

Then the crowds settled back to watch the other four finish—Burman, in the Marquette-Buick, Mulford and Horan, in the Loziers, and Dawson, in Harroun's Marmon.

Brown won his race by consistent driving, rather than by spectacular speed. Of course, he drove with lots of speed, but he never once made a lap under 14 seconds, while, on the other hand, only three laps were made slower than this figure. Twenty-one laps never varied more than about 35 seconds, and all at a speed approximating 73 miles an hour. He never was lower than sixth position and most of the time was third and fourth. He simply held his great speed in reserve and kept in position to take advantage of every point and at all times was close enough to the leaders to have cut down his time materially had the occasion demanded it. He drove his turns with care and caution, and, in a way, this accounts for his splendid showing. His first stop came in the eleventh lap, when his right rear tire let go and slewed him into the ditch at Montgomery cross roads. This cost him 6 minutes and put him sixth in the race. But on the road again he set up a faster pace for two laps, until again he was forced to make a tire change. This was done in good time and his lead for third place was large enough to let him hold it. Then, in the nineteenth lap, when Nazzaro went out, he crept up into second place 51 seconds behind de Palma. De Palma increased his lead this lap to 1 minute, 27 seconds, and to 1 minute, 56 seconds in the next lap. Notified of this fact at the beginning of the twenty-third lap, Brown started to open up, but, passing de Palma on the road and taking first place, he again resumed his steady pace and drove just hard enough to maintain the lead he then had over Hemery.

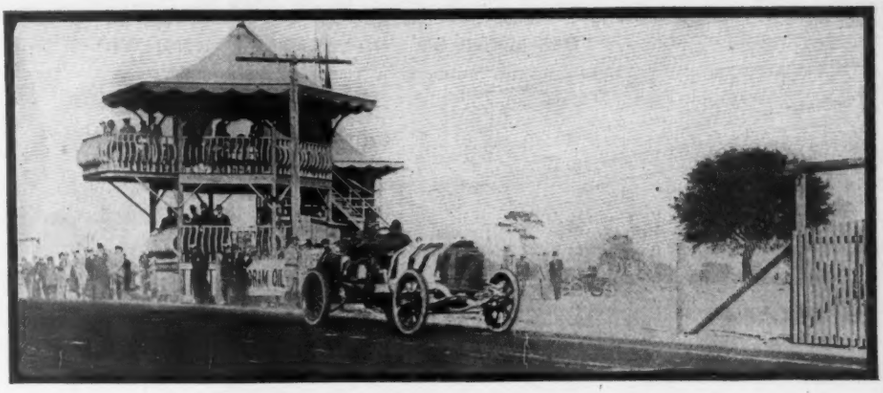
Hemery had four bad laps, which cost him the race. In the ninth lap, after leading the field up to that time, he had to change both rear tires, which gave him the circuit in 19:13 and dropped him into fifth place. His next lap was slow also, but he held his position and worked into fourth in the eleventh, when both Brown and Wagner had to stop. But he dropped back a position in the next, when Haupt took up the lead and held fifth two laps, finally coming into fourth again when Haupt went out for good. This position he held till

GOVERNOR BROWN GREETS JOE DAWSON

DAVID BRUCE-BROWN AT THE TAPE AWAITING THE WORD

Wagner dropped in the eighteenth, when he took third, reaching second by the elimination of de Palma in the twenty-third. In this position he finished, although he made a terrific drive after Brown in the last lap. Hemery's best lap was 13:50, and he had several under 14. But he, too, seemed to drive most cautiously, especially at the bad turns, and his work was marked by its consistency.

Burman, in the Marquette-Buick, drove his usual wild race, burning up tires to beat time. He, too, was placed through the elimination process. He stopped nine times to change tires, making fifteen changes in all, and replaced one chain which was sagging, a right. But, allowing ample time for the tire changes, he could not have bettered his position. The fact that half of his gears were locked out also bothered him, and, after stalling his engine after his second tire change, Hall, his mechanician, helped to start the car every time by pushing on the wheels. Up until the thirteenth lap his position was seventh and eighth, and then, as the leaders began to drop, he crept up, place by place, finally finishing third with about 15 minutes' lead over his nearest American competitor, Ralph Mulford. But Burman, by his wild riding, has endeared himself to the public and all through the long grind he was cheered wildly at every approach to the stands. Everybody, it seemed, was pulling for him, and he received a grand ovation at the finish. He made tire changes in the third, fourth, seventh, eighth, ninth, tenth, thirteenth, sixteenth and twentieth laps. But he was not troubled with mechanical trouble at any time and never once lifted the hood to his engine. His fastest lap was 14:20, and naturally he had a lot of slow ones in which he was forced to stop.



BURMAN IN MARQUETTE-BUICK FLASHES PAST THE STAND

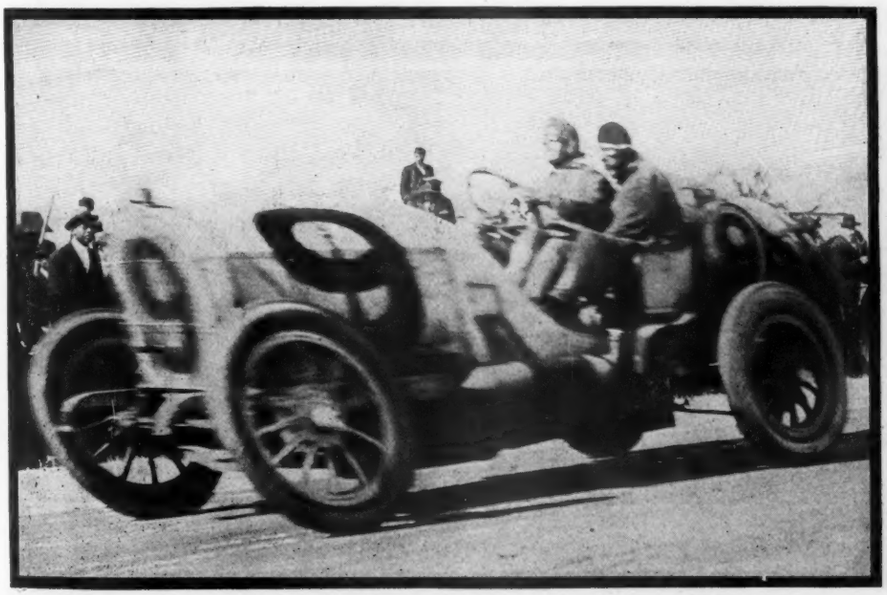
MAYOR TIEDEMAN CONGRATULATES HEMERY

Mulford Runs Consistently

Mulford, in the Lozier four, did the ninth lap in 15:17. This was his fastest, and he, like Horan and most of the other American drivers, held down to a moderately fast speed, in the hope that the foreigners, in going after each other, would burn up their tires at such a rate as to give the American cars a chance at first money. He stopped in the second lap for tires at Burnside, and at the pit for supplies in the twelfth, but, aside from this, he made no stops and drove uniformly at around 16 seconds, or a little better. He started last and simply worked down into position when others succumbed to mechanical troubles.

The same story applies largely to Horan, in his Lozier six, although he did one fine lap in the ninth, when he took a position away from Harroun. But he lost it back again when he stopped in the thirteenth for supplies, and, after working down as Mulford did, finally beat Dawson, who had succeeded Harroun by doing the last lap in 15:53. In fact, the last five laps furnished some grand work between these two drivers, with Horan's reserve finally winning out. As a matter of fact, the showing made by both Loziers was on a par with that of any car in the race except only that they lacked the speed.

The little Marmon showed a wonderful race and acquitted itself with honor. To begin with, it had less piston displacement than any other car entered, and from nearly a half to a third of that of any car that finished the race. From start to finish it never changed a tire and had Harroun not given out because of weakness from a slight disorder and stopped to change with Dawson in the fourteenth lap, it would have been fifth with ease. Its only other stop was in the twentieth lap, when Dawson took on oil and water. Only the smallness of its motor and consequent lack of extreme speed kept it out of a better position, and it was one of the track favorites every round. Dawson, having won the day before, was a favorite and came in for a warm reception at the hands of the spectators.



HEMERY IN BENZ MOVING BETTER THAN 100 MILES AN HOUR

De Palma Drives Fine Race

De Palma drove a great race and really showed class with any on the course. Had his car held up chances are that the race was his, for at the time he went out he had about 2 minutes' lead and there is considerable doubt as to whether Brown could

TIME MADE BY CONTESTING CARS IN THE GRAND PRIX AS RECORDED BY C. H. WARNER'S

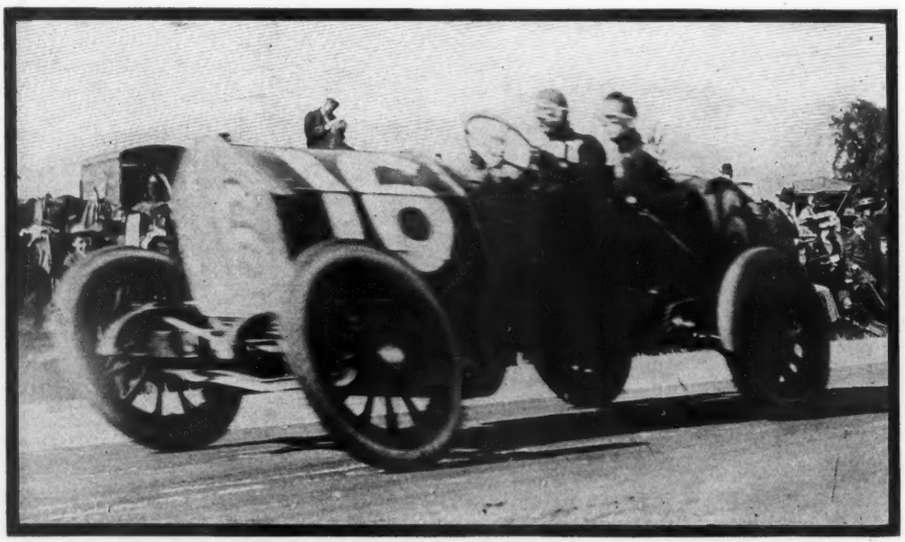
No.	Car	Driver	Bore	Stroke	Piston displacement	Carbureter	Magneto	Drive	Tires		Lap 1 17.3	2 34.6	3 51.9	4 69.2	5 86.5
15	Benz	D. Bruce-Brown	6.1	7.87	920	Benz	Bosch, two	Chain	Michelin	Total time	14:28	28:49	42:57	57:12	71:33
										Lap time	14:28	14:21	14:08	14:15	14:21
9	Benz	V. Hemery	6.1	7.87	920	Benz	Bosch, two	Chain	Michelin	Total time	14:18	28:09	41:59	55:50	69:49
										Lap time	14:18	13:51	13:50	13:51	13:59
17	Marquette-Buick	ft. Burman	6	5.25	593.7	Schebler	Splitdorf	Chain	Michelin	Total time	15:58	30:38	46:33	63:19	78:20
										Lap time	15:58	14:40	14:55	16:46	15:01
4	Lozier	R. Mulford	5⅝	6	544.6	Diezeman	Bosch	Shaft	Michelin	Total time	20:23	37:43	53:42	69:53	85:47
										Lap time	20:23	17:20	15:59	16:11	15:54
12	Lozier six	Horan	4⅝	5½	554.4	Miller	Bosch	Shaft	Michelin	Total time	16:27	32:30	48:34	64:34	80:42
										Lap time	16:27	16:03	16:04	16:00	16:08
14	Marmon	Harroun-Dawson	4½	5	318.1	Schebler	Bosch	Shaft	Michelin	Total time	16:35	32:53	49:05	65:05	81:05
										Lap time	16:35	16:18	16:12	16:00	16:00
19	Fiat	R. De Palma	5⅛	7½	615.5	Fiat	Bosch	Chain	Michelin	Total time	15:03	30:14	45:23	60:10	74:54
										Lap time	15:03	15:11	15:09	14:47	14:44
10	Fiat	F. Nazarro	5.11	7.48	615.5	Fiat	Bosch	Chain	Michelin	Total time	14:31	29:09	43:28	57:33	71:23
										Lap time	14:31	14:38	14:19	14:05	13:50
6	Pope-Hartford	C. Basle	4.75	5.5	389.9	Pope-H.	Splitdorf	Shaft	Michelin	Total time	16:38	32:48	52:14	68:37	84:59
										Lap time	16:38	16:10	19:26	16:23	16:22
16	Fiat	L. Wagner	5.11	7.48	615.5	Fiat	Bosch	Chain	Michelin	Total time	14:21	28:24	42:20	56:44	71:05
										Lap time	14:21	14:03	13:56	14:24	14:21
18	Benz	W. Haupt	6.1	6.3	736	Benz	Bosch Two	Chain	Michelin	Total time	14:30	28:56	43:32	57:37	71:47
										Lap time	14:30	14:26	14:36	14:05	14:10
7	Alco six	H. Grant	4.75	5.5	566.4	Alco	Bosch Two	Chain	Michelin	Total time	15:53	31:25	46:49	62:23	77:50
										Lap time	15:50	15:32	15:24	15:34	15:32
3	Marquette-Buick	A. Chevrolet	6	5.25	593.7	Schebler	Splitdorf	Chain	Michelin	Total time	14:19	28:44	42:59	63:20	79:00
										Lap time	14:19	14:25	14:10	20:26	15:40
13	Pope-Hartford	L. Disbrow	4.75	5.5	389.9	Pope-H.	Pope-H.	Shaft	Michelin	Total time	17:31	34:02	50:17	66:32	84:16
										Lap time	17:31	16:31	16:15	16:15	17:44
8	Marmon	Dawson	4.5	6.5	381.7	Schebler	Bosch	Shaft	Michelin	Total time	14:59	29:34	44:05	58:35	Broke
										Lap time	14:59	14:35	14:31	14:30	

have cut him down. Starting carefully, he hung onto sixth and seventh and eighth positions till the middle of the race, and then, when others began to fall, he commenced to cut down his time until he finally worked into the lead. In the twelfth he made his first stop to change a right rear, and then made the lap next time in 14:21. In the thirteenth he stopped at the pit for supplies and took 15:53 to the lap. But that was his only slow lap after he got well started, and most of them were down around 14. His twenty-first was a fine lap, his fastest, in fact, 14:04, but in the next he began to slow down on account of the trouble that finally developed. The vibration and jar had broken a water connection and his radiator ran dry. On his last lap he noticed that the engine missed a few times, but it came in, apparently, and he concluded that it was a dirty plug that had finally cleared. But on the twenty-third lap his engine went all to the bad and investigation showed a cracked rear cylinder as the result of an empty radiator.

Dizzy Pace Set by Nazzaro

Nazzaro furnished about as much excitement as any entrant in the race, as well as the fastest lap. Starting in sixth position in the first and second laps, the clever Italian worked his way up by fast driving until he had reached second place in the sixth lap. Then, in the seventh, he negotiated the fastest lap of the race, in 13:42, or at the rate of almost 76 miles an hour. The next lap he continued his breakneck drive and probably lost the race as a result. Coming to the turn at Burnside he threw his right rear tire and skidded off into the ditch, bending his right side of the rear axle so that the line of tread was at least 6 or 7 inches nearer the center line of the chassis than it should have been. But he replaced the tire and drove like mad, making the lap in 14:01 in spite of the stop. In the next lap, however, he stopped for supplies, and the damaged rear axle having been reported to the technical committee and to Referee Morrell, he was held up in the eleventh lap for an inspection of the bent rear member. In the meantime, Caleb Bragg, in charge of the team, had asked the committee to act upon the question of repairing the damage, and it was decided to put it up to Nazzaro. He insisted that the bend didn't make any difference, and so was allowed to continue the race. But from that time on he was unable to attain the speed he had shown previously, although he made fast laps around 14 until the seventeenth, when he broke his right chain. He repaired the injury and proceeded, with some loss of time, and then, in the next lap, the chain broke again. Once more he made a repair, only to break another chain on the nineteenth lap, and, not having another which would fit his car in the camp, he was forced to quit the race. The interesting feature of this series of events lies in the fact that the right chain, which drove the bent axle, held up perfectly all through the race, while the left chain was the one that broke three times. This is explained by the technical men in this way: The bending of the right side of the axle threw the greater tractive effort on the left side and made the strain too great for that chain to bear. Nazzaro drove a great race while he lasted, and for four laps after his first misfortune was leading the procession.

The Pope-Hartfords kept up to their hard luck record set at Atlanta the week before. Basle, starting sixth, finished the first lap thirteenth, and kept about this position for ten laps, when he moved up a few notches when the other cars commenced to drop out. But he made no remarkably fast laps at any time, and stopped first at Montgomery cross roads



WAGNER IN FIAT BEFORE ACCIDENT PUT HIM OUT

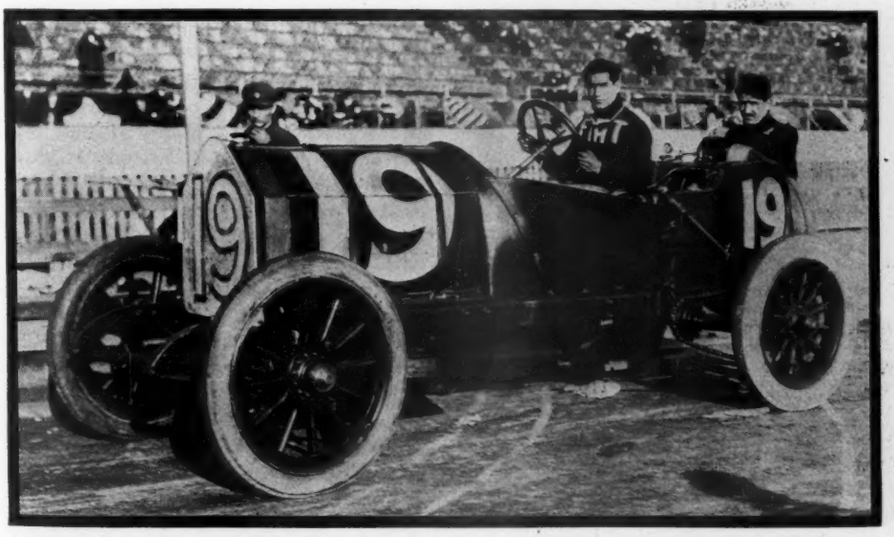
AUTOMATIC TIMING DEVICE—RACE WON BY BRUCE-BROWN IN A BENZ AT RECORD PACE

6 103.8	7 121.1	8 138.4	9 155.7	10 173.0	11 190.3	12 207.6	13 224.9	14 242.2	15 259	16 276.8	17 294.1	18 311.4	19 328.7	20 346.0	21 363.3	22 380.6	23 397.9	24 415.2	Miles per hr.
85 :59	100 :26	114 :46	129 :04	143 :18	163 :48	178 :01	192 :02	206 :05	222 :15	236 :32	250 :37	264 :52	279 :08	293 :59	308 :36	323 :16	337 :58	353 :05.35	70.28
14 :26	14 :27	14 :20	14 :18	14 :14	20 :30	14 :13	14 :01	14 :03	16 :10	14 :17	14 :05	14 :15	14 :16	14 :51	14 :37	14 :40	14 :37	15 :12	
83 :49	98 :04	112 :11	131 :24	146 :46	161 :16	175 :48	193 :26	209 :33	223 :40	237 :54	252 :21	266 :30	281 :00	295 :36	310 :24	324 :50	339 :12	353 :06.77	70.28
14 :00	14 :15	14 :07	19 :13	15 :22	14 :30	14 :32	17 :38	16 :07	14 :07	14 :14	14 :27	14 :09	14 :30	14 :36	14 :48	14 :26	14 :22	13 :54	
93 :11	109 :25	125 :16	139 :40	156 :21	172 :02	186 :22	202 :13	216 :39	231 :06	248 :56	263 :41	278 :09	296 :05	313 :22	327 :56	342 :28	357 :00	371 :23.49	67.07
14 :51	16 :14	15 :49	14 :24	16 :41	15 :41	14 :20	16 :51	14 :26	14 :27	17 :50	14 :45	14 :28	17 :56	17 :17	14 :34	14 :32	14 :32	14 :23	
101 :49	118 :24	133 :46	149 :03	164 :31	180 :06	195 :49	213 :08	228 :44	244 :24	260 :06	275 :47	291 :45	307 :43	323 :34	339 :09	354 :39	370 :27	386 :12.68	64.50
16 :02	16 :35	15 :22	15 :17	15 :28	15 :35	15 :43	17 :19	15 :36	15 :40	15 :42	15 :41	15 :58	15 :58	15 :51	15 :35	15 :30	15 :48	16 :45	
96 :49	113 :07	129 :19	145 :15	161 :15	177 :15	193 :19	209 :34	228 :44	244 :49	261 :00	277 :14	293 :25	309 :36	325 :55	342 :04	358 :08	374 :09	390 :02.72	63.87
16 :07	16 :18	16 :12	15 :56	16 :00	16 :00	16 :04	16 :15	19 :10	16 :05	16 :11	16 :14	16 :11	16 :11	16 :19	16 :09	16 :04	16 :01	15 :53	
96 :54	112 :59	129 :02	145 :14	161 :24	177 :33	193 :41	210 :43	226 :47	242 :32	258 :22	274 :12	290 :09	306 :11	323 :48	340 :52	357 :29	374 :03	390 :22.22	63.39
15 :49	16 :05	17 :03	16 :12	16 :10	16 :09	16 :08	17 :02	16 :04	15 :45	15 :50	15 :50	15 :57	16 :02	17 :37	17 :04	16 :37	16 :34	16 :19	
89 :34	104 :10	118 :31	132 :56	147 :10	161 :27	175 :36	189 :57	205 :50	220 :34	235 :15	249 :44	264 :01	278 :17	292 :32	306 :36	321 :24	Cracked cylinder		
14 :40	14 :36	14 :21	14 :25	14 :14	14 :17	14 :09	14 :21	15 :53	14 :44	14 :41	14 :29	14 :17	14 :16	14 :15	14 :04	14 :48			
85 :14	98 :56	112 :57	129 :04	143 :02	157 :31	175 :04	189 :13	203 :20	218 :00	232 :49	250 :14	274 :53	Broken chains						
13 :51	13 :42	14 :01	16 :07	13 :58	14 :29	17 :33	14 :09	14 :07	14 :40	14 :49	17 :25	24 :30							
101 :12	117 :25	134 :06	156 :09	172 :44	189 :15	205 :48	222 :14	238 :40	255 :26	272 :08	288 :51	333 :10	Broken valve						
15 :53	16 :13	16 :14	22 :03	16 :33	16 :31	16 :33	16 :26	16 :26	16 :46	16 :42	16 :43	44 :19							
85 :31	99 :58	114 :05	128 :11	142 :17	161 :06	175 :09	192 :03	220 :24	245 :40	261 :43	Turned over								
14 :26	14 :27	14 :47	14 :06	14 :06	18 :49	14 :03	15 :54	28 :21	25 :16	16 :03									
85 :33	102 :07	116 :04	129 :54	143 :37	157 :20	171 :09	Turned over												
13 :46	16 :34	13 :57	13 :50	13 :43	13 :43	13 :49													
93 :27	108 :54	124 :24	139 :51	155 :23															
15 :32	15 :27	15 :30	15 :27	15 :32	Stripped high gears														
96 :37	115 :07	130 :18	Broke crankshaft																
17 :37	18 :30	15 :11																	
100 :46	117 :17	133 :31	Lifted cylinders																
16 :30	16 :31	16 :14																	
crankshaft																			

in the eighth lap to change a spark plug. In the next he stopped for gasoline and continued until the eighteenth lap, when a valve broke at the key seat and, falling into the cylinder, put him out for good. Disbrow lasted only eight laps, when he was forced to quit because cylinders one and two lifted, following a valve breakage.

Wagner Meets With Accident

Louis Wagner, in his Fiat, was responsible for the only worry over a possible fatality. Early in the race he broke the bolt on the left hand side of the right front spring clip, as well as cracking the spring seat itself at this point. He was stopped in the eleventh lap and an inspection made of the damage. The technical committee suggested that a new seat be installed, and Caleb Bragg was in favor of it, but Wagner insisted that there was ample clamping power remaining, and flatly refused to make the change. So he was allowed to proceed against the advice of everybody consulted. In the fourteenth lap he broke a chain and stopped at the pit next time around for another one. Again the broken spring seat was inspected and, not showing any different conditions than at first, he proceeded without repairs. In the seventeenth lap, however, he met with the accident that caused his dropping from the race. Near La Roche avenue and the bridge which crosses between it and Skidaway road is a soft spot in the road, and all the drivers were careful to avoid hitting it. On this lap, as in all those previous, Wagner turned out to avoid it, but failed to clear. The car hit the soft spot and the next thing eye witnesses saw was Wagner's car turning end for end into the ditch, after striking the side of the abutment on the bridge. Wagner claims that he simply skidded after hitting the soft spot and went into the bridge, and claims that the impact against the bridge broke off the front axle at the weakened spring seat. But the technicians who examined the car and who were familiar with its condition, insist that, when Wagner struck the soft spot at speed, he simply tore away the rest of the spring clip and, driving the front axle back out of line, lost control of the car and struck the bridge, so that he turned over. First reports were that both he and his mechanician were fatally hurt, and they were rushed to a hospital. Later it was discovered that Wagner was only bruised about the abdomen from being jammed against the steering wheel, while the extent of Ferro's injuries was a magnificent, big black eye, obtained by striking a branch of a bush into which he was hurled. Their escape was miraculous, for the car was completely wrecked. Wagner had negotiated some mighty fast laps up to the start of his troubles, and, next to Hemery, he was picked as the likely winner.



DE PALMA IN FIAT, WHO WAS FACTOR FOR A TIME

Haupt First to Drop

Willie Haupt was the first on the program to meet with an accident that might have proved serious. Starting with fifth, at the end of the first lap he worked into fourth at the start of the sixth, but tire trouble at Burnside set him back a position. He began to beat it upon resuming again, and when Wagner, Nazzaro and Brown all had bad laps in the tenth, he assumed the lead. In the eleventh he stopped for supplies at the pit, but negotiated a wonderful lap, notwithstanding, and kept his lead. But he couldn't stand prosperity, for on the very next lap he tried to take the right angle turn at Montgomery cross roads at speed, and, as a result, was put out of the race. As he got into the turn he saw that he couldn't make it, and that it was a tree or the ditch. By a clever piece of maneuvering he managed to strike the tree broadside, which sent him crashing and careening

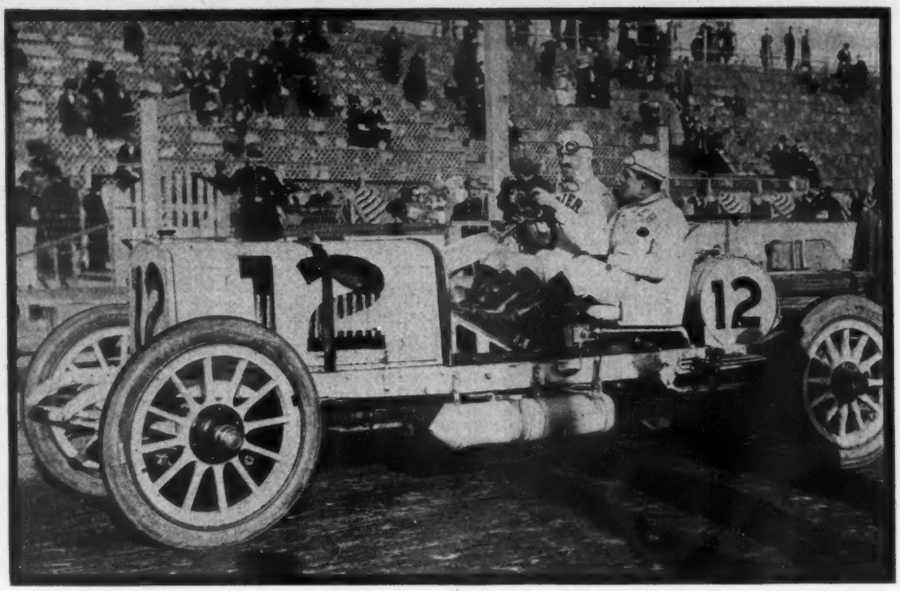
along the side of the ditch until he lost all control of the car, which turned over and over, throwing both himself and his mechanician clear of the wreckage. It was this that saved them from serious injury, for the car was a total wreck. As it was, neither was hurt to speak of.

Grant Goes Out Early

Grant, in his Alco, two-time Vanderbilt winner, started out to win the race by maintaining about a 68 or 69-mile an hour speed. He never reached better than seventh place during the ten laps he lasted, and finally quit the race in the eleventh, after stripping his high gears.

Arthur Chevrolet was much in evidence for the first three laps, but in the fourth he stopped for a right rear tire change at Norwood avenue, and then again at the pit for a left rear. Making this change, the jack sank into the soft earth and let the wheel down before the new tire was installed, which lost several seconds of valuable time. In the sixth lap both rears went to the bad again, and in the seventh he threw a right rear on Skidaway road. Then, while beating it in the ninth, his crankshaft broke and he was out for good.

Joe Dawson, starting in the big Marmon, was the first to succumb to mechanical troubles, being put out, just as Howard Marmon said he would, with a broken crankshaft. He was driving the same car Harroun had in the Vanderbilt, which showed similar trouble, and the Marmon crew knew it would be nothing but luck that would let them by without a broken shaft. This is the only car they ever have built with this size equipment in the engine, and the same car will not be seen in action again. During the four laps he lasted, Dawson drove a pretty race. Dawson then went into the pit and finally replaced Harroun when the latter gave out at the end of the thirteenth lap.



JOE HORAN IN LOZIER SIX THAT FINISHED RACE

Besides the cup, Brown took down $4,000 for first, while Hemery won $2,000 for second. Burman won $1,000 for third and $1,000 for being the first American car to cross the line. This, in addition to tire and equipment prizes put up on the side.

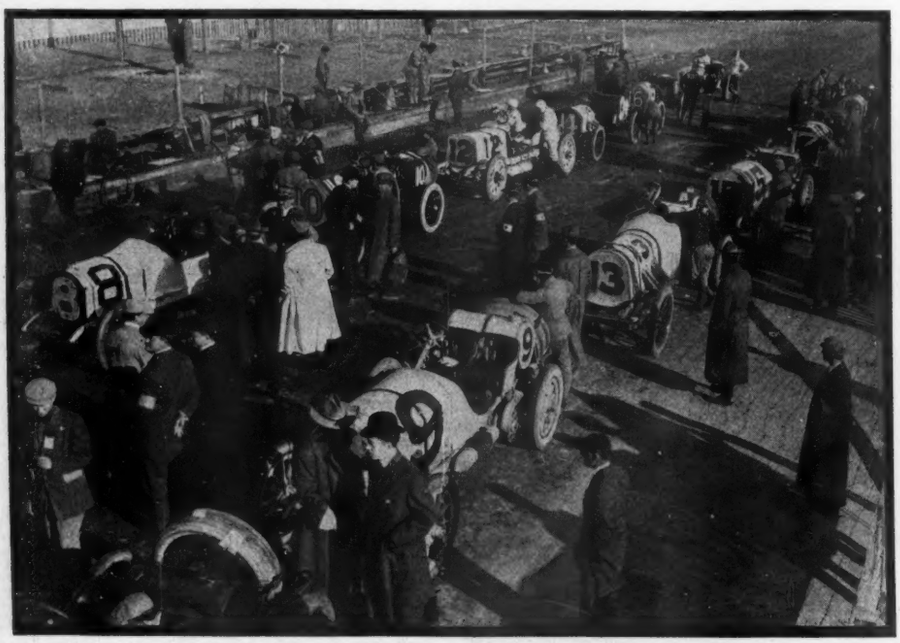
The weather, although a trifle cool in the early morning, was ideal, and the crowds that thronged the course and packed the stands is estimated at everything from 50,000 to 100,000. At any rate, the attendance was so great at both days that the financial end was amply large to gratify even the most optimistic. Thus it will be seen that every condition was in evidence which could possibly make for the greatest race meet ever held.

The original entry list contained the names of nineteen starters. But on Wednesday the Sharp-Arrow overturned, killing the mechanician, Albert Fuchs, and severely injuring Sharp, so that it could not start. The Roebling-Planche blew out a cylinder Wednesday night and was scratched, and the Simplex broke its end bearing and was unable to obtain duplicate parts in time to compete. This came about in a peculiar way. During the Atlanta races this car, which was to have been driven by Matson, broke an oil lead and ran for some time before it was discovered. Repairs were made and the car thoroughly overhauled, but no damage could be found. But, as it developed in practice, this breakage had cost the burning of the end bearing, which finally gave out the day before the races started.

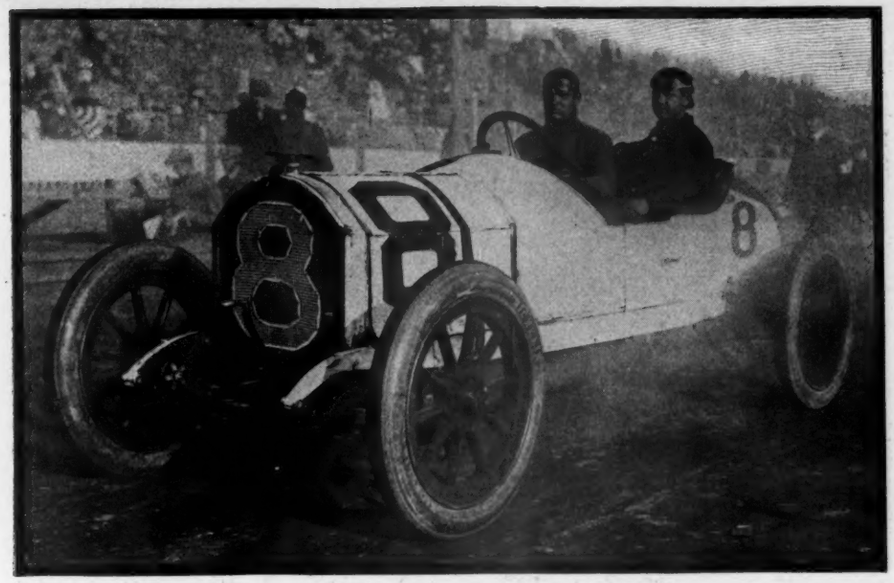
The Marquette-Buick, which Hugh Hughes was to drive, was stripped of some parts for repairs on Burman's car, and so it couldn't start.

Fifteen faced the starter, and, promptly to the second, Arthur Chevrolet, with Albert Seraye, in a Marquette-Buick, was sent away at 9:01—his car being No. 3 and having a minute delay over the two smaller numbers which should have started. He was followed by Ralph Mulford and Ed Chandler, in a Lozier. Then, in succession, others crossed as follows: Charles Basle and his brother in a Pope-Hartford, Harry Grant and F. H. Lee in an Alco, Joe Dawson and Bruce Keene in the big Marmon, Victor Hemery and Franz Heim in the small Benz, Felice Nazzaro and Tony Fagnano in a Fiat, Joe Horan and George Ainsley in the Lozier six, Louis Disbrow and R. Church in a Pope-Hartford, Ray Harroun and Harry Goetz in the small Marmon, David Bruce-Brown and Fritz Craemer in the big Benz, Louis Wagner and Tony Ferro in a Fiat, Bob Burman and Howard Hall in a Marquette-Buick, Willie Haupt and Harris Feyhle in a small Benz, and Ralph de Palma and Joe Pozzo in a Fiat.

Hemery was first around, completing the circuit in 14:18, or about 74 miles an hour.



CARS LINED UP FOR START OF GRAND PRIX



DAWSON IN MARMON BEFORE RELIEVING HARROUN

He was followed in order by Arthur Chevrolet, Wagner, Bruce-Brown, Haupt, Nazzaro, Dawson, de Palma, with but a few seconds separating them, and then, farther back and strung out, were Grant, Burman, Horan, Harroun, Basle, Disbrow and Mulford in the rear, with a very slow lap.

Hemery maintained his lead for eight laps, with Wagner, Nazzaro, Bruce-Brown and Haupt fighting out the first five positions alternately. Chevrolet took third for two laps, but developed tire trouble and then, finally, engine trouble put him out entirely. De Palma worked into sixth for about ten laps, with the rest of the cars bringing up the rear and far behind in time.

In the ninth lap Wagner took up the lead, followed by Nazzaro, Bruce-Brown, Haupt, Hemery, de Palma, Burman, Grant, Harroun, Horan and Mulford and Basle. These positions were approximately maintained till the thirteenth lap, when Nazzaro forged to the front, holding till the sixteenth lap. De Palma kept second, with Brown third and Hemery fourth and Burman sixth, till the same time when de Palma worked into first, followed by Nazzaro, Brown, Hemery, Burman, Dawson, who succeeded Harroun, Mulford, Horan and Basle. In the nineteenth the field had been reduced to seven, in this order: De Palma, Brown, Hemery, Burman, Dawson, Mulford and Horan.

This order was maintained till the twenty-third lap, when de Palma dropped, leaving the finish to the six that were noted above. Brown took the lead and Hemery, Burman and Mulford followed to the finish, while Horan unseated Dawson on the last lap.

Description of Course

Starting at the intersection of Dale avenue, the course lies down Waters road due south almost 5 miles, with but a very slight bend a few hundred feet below the starting point. Here Montgomery cross road is reached, and this marks the first turn, to the left for a few yards at right angles, and then a right turn down Whitefield avenue at an angle of perhaps 100 degrees. Then the course bends to the east down Whitefield avenue a couple of miles, until it intersects Beaulieu road, at an angle of about 35 degrees, for the third turn. This road it follows a little west of south for perhaps a mile, until the hairpin turn at Burnside is reached, which marks the southern limit of the course. Then northeast, up Ferguson avenue, bending slightly to the east at Norwood avenue, about 4 or 5 miles, when a bad right angle turn to the left puts the course into La Roche avenue by means of a curving broad turn of about a quarter mile. La Roche avenue is followed about a mile and then a 30-degree turn to the right into Skidaway road, which is well named, for perhaps another mile, and then the last right angle turn to the left onto Dale avenue, which constitutes the stretch of more than a mile straightaway to the intersection of Waters road. The course is 17.3 miles long and the grand stand is located on Waters avenue, just beyond the turn, so that the cars can be seen coming up the stretch on Dale avenue some little distance. Across the track are the official and press stands, and on the inside, but farther south, on Waters road, are the bleachers.

The track was in wonderful condition at the start, and the policing was perfect, the city police handling that portion of the track within their jurisdiction, and the state troops handling that without. In fact, the entire officering of the 2 days' races was a pleasure to see. Not a detail was overlooked, and the races all went off like clockwork, to the very second. Telephone stations were established at Montgomery cross road, Beaulieu and Montgomery, Burnside, Norwood avenue, La Roche avenue, Bonnan Bella—half way between Norwood and Skidaway road, on La Roche avenue—Skidaway road and Dale avenue. These stations, with a relay of men, kept the stands fully informed of the progress of the race, which was made known by a corps of megaphone announcers.

There was one man not at all in evidence to the outside world at the Savannah races to whom goes by rights a laurel crown for the part he play in the maintenance of the races, and that man is Charles H. Warner, and his electric timing device.

Never before has the absolute need of such an instrument as his been so cleverly and completely demonstrated as in the running of the grand prix. Without his instrument, so the officials concede, the picking of the winner would have been sheer guess work, for no stop watch ever used could have properly recorded a difference

WAGNER IN FIAT TAKING TURN AT FAST CLIP

BILLY KNIPPER IN THE ITALIAN LANCIA CAR

so small as that which separated Brown and Hemery over a period of more than six hours. As it was, the several excellent stop watches that lay on the timing table in case of emergency were all more than a second at variance before the race was over. But with Warner's instrument every car movement was absolutely, mechanically and automatically timed to the hundredth part of a second.

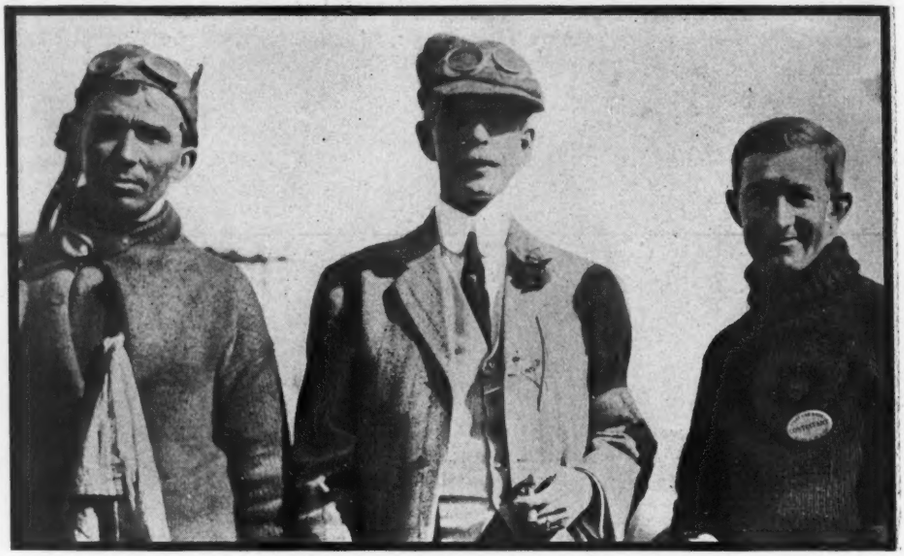
Scoring System Excellent

The entire scoring and checking system at this race was the last word of proficiency, too. Three men checked the cars as they came over the wire and then checked them with the tape on the instrument. One man presided at a box index containing one slip for each lap of each car. On these slips the handicap of 30 seconds per car, in arithmetical progression as they started, was indicated, so that immediately the passing time was recorded on the tape it was called and entered on these slips, which in turn were passed to another man, who figured the elapsed time and entered it in the square on the score sheet. Then a bulletin, showing the car number, its position, lap and time, was made and passed to a telegraph operator connected with the two score boards. There it was printed on the separate sheet for each car lap.

How System Worked

Then the man in charge of the score sheet in the stand deducted the combined lap time, so as to get the time for each lap. If a lap time showed any great variation from its predecessors, it showed either an error or a stop of the car. A check was immediately instituted, and if the time was found correct, as it was in every single instance of the 2 days, search for the car was immediately instituted. This also served to give a perfect story of each car's running, for when there was a lap variation of more than a few seconds, it was noted on a sheet devoted to each car, and the technical end was investigated to discover what had caused each delay.

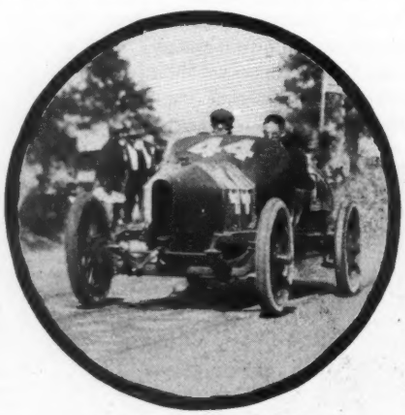
In this way the vast throng was kept in constant touch with the situation and the press had little difficulty in handling a running story with assurance of positive correctness.



MECHANIC MAXCEY, MAYOR TIEDEMAN AND BILLY KNIPPER

SAVANNAH, GA., Nov. 11—Billy Knipper, driving a Lancia, with James Maxcey as his mechanician, won the Tiedeman trophy, the curtain-raiser of the light-car races preceding the grand prix, today, holding the lead from wire to wire. The race was 190.3 miles in length, or eleven laps around the course, and the time consumed by Knipper was 3 hours, 19 minutes, 22.67 seconds. F. A. Witt, in an E-M-F, finished second, followed by Thomas Costello in a Maxwell for third.

Knipper never stopped during the entire race, and took the last two laps in jogging time after cinching his lead against ordinary conditions. There were eight entrants, all of which started promptly at 10 o'clock and coincidentally with the six starters for the Savannah trophy.



KNIPPER IN THE LANCIA

Harry Cohen, driving an E-M-F, was the first over the wire in this event, but he lasted only two laps, developing a cracked cylinder in the third, which caused his withdrawal. He was missing as he crossed the wire the second time and could last only as far as Dale avenue.

Ellery Wright, in a Maxwell, followed Cohen across. He drove a consistent race. His best lap was the eighth, which he completed in 19:33. In the fifth he was forced to stop at the pits for supplies, which cost him a minute and a half. He finished fourth.

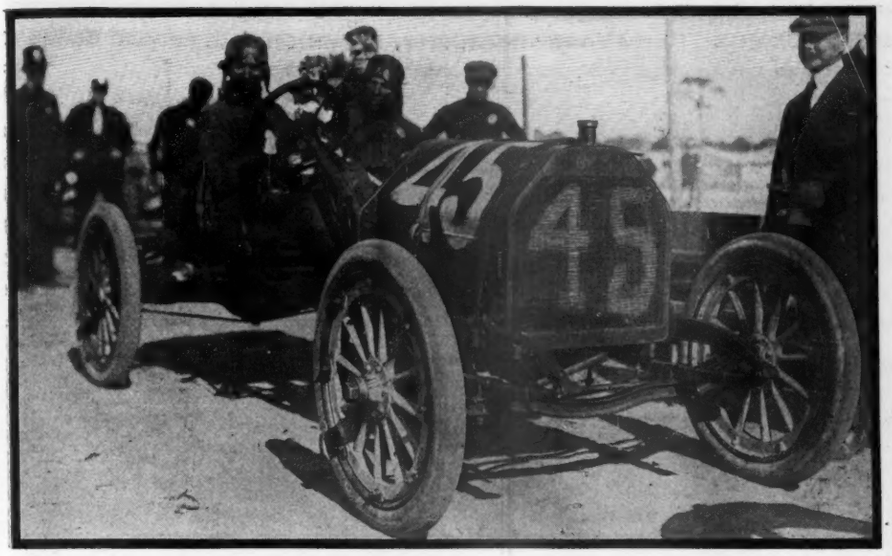
Harry Knight, in a Cole, was the third man to cross, but he lasted only into the third lap, when, like Cohen, he was forced to quit on Dale avenue with a cracked cylinder.

Knipper was fourth across the tape at the start, but before the first lap was over he had passed those who preceded him, making the first lap in 18:10, the fastest time for the lap. The second lap he re-

RESULTS OF 190.3-MILE RACE FOR THE TIEDEMAN TROPHY, FOR 161-230 CLASS

Car No.	Car	Driver	Mechanician	Cyl	Bore & Stk.	Magneto	Carbureter	Drive	Tires	Rims	Radiator
44	Lancia	Knipper	Maxcey	4	4 x4⅜	Bosch	Lancia	Shaft	Michelin	Michelin	Lancia
45	E-M-F	Witt	Lundgreen	4	4 x4½	Splitdorf	Schebler	Shaft	Michelin	Continental	E-M-F
48	Maxwell	Costello	Briggs	4	4¼x4⅛	Bosch	Maxwell	Shaft	Ajax	Continental	Briscoe
42	Maxwell	Wright	Woole	4	4¼x4⅛	Bosch	Maxwell	Shaft	Ajax	Continental	Briscoe
46	Maxwell	Doorley	Stone	4	4 x4	Bosch	Maxwell	Shaft	Ajax	Continental	Briscoe
41	E-M-F	Cohen	Ragsdale	4	4 x4½	Splitdorf	Schebler	Shaft	Michelin	Continental	E-M-F
43	Cole	Knight	Johnson	4	4 x4	Remy	Schebler	Shaft	Michelin	Dorian	Long
47	Cole	B. Endicott	H. Endicott	4	4 x4	Remy	Schebler	Shaft	Michelin	Dorian	Long

CAPTURES THE TIEDEMAN TROPHY ROAD RACE



WITT IN E-M-F, SECOND IN TIEDEMAN CUP RACE

duced his time 35 seconds, and from that time on increased his lead lap by lap till the eighth lap, when he was nearly 5 minutes to the good. Then he slowed down. But in the tenth lap Witt, in his E-M-F, had to stop, and Knipper gained several minutes more, finally finishing with almost 7 minutes to spare. It is interesting to note that Knipper drove the entire race with steel-studded rear tires, which held up all the way.

Witt followed Knipper at the start and was with him in the stretch for two or three laps. But, while he drove a pretty and steady race, he never was able to develop the speed necessary to jeopardize Knipper's position. He kept going till the tenth, when he had to stop for water and oil. Starting his last lap, his car was running well, but at the first bend past the stand his engine began missing and he was just able to limp across the finish wire with only two cylinders hitting.

Martin Doorley started sixth and kept going in very slow manner till the ninth lap, when he stopped at the pits for gas, oil and water. He finished the race, however, running smoothly in fifth place.

Bill Endicott, in his Cole 30, was the seventh away and finished the first lap in fourth position. But, turning into Norwood avenue the second time around, his crankshaft broke off right up against the clutch and he was down and out.

Thomas Costello brought up the rear at the start, but made the best showing of the Maxwell team. His fifth lap was slow, owing to a stop to look at his engine, which had started missing. But no trouble was discovered and he resumed, finally getting a presumably dirty plug blown clean. In the seventh lap, however, he stopped at the pits for oil and gas, and on the following changed both rear tires at Burnside, finishing third.

SCORE IN LITTLE RACE

The showing of the Maxwells was good, for all three starters finished with their cars in good condition, losing better positions largely through lack of speed. All three drivers drove consistently and cautiously, especially in taking the curves which were not banked.

The Cole camp was up against hard luck or poor management, for their cars did not reach Savannah till after 10 o'clock the night before the race. They were to have run at Atlanta last week, but in some unaccountable manner were lost out of Shreveport and could not be located till the last minute. As a result they never had a chance at tuning up, and neither Knight nor Endicott had even had a jog around the course, to say nothing of practice trials.

Knipper's average for the race was 57.27 miles per hour, which beat his record of 2 years ago over the course, which was in much better shape today than at that time. His fastest lap, 17.20 in the eighth circuit, which was also the fastest lap of the race, was at an average of a little over 60 miles an hour. Had he been hard pressed it is certain that he could have exceeded his general average without much trouble. But, having in mind his hard luck over the Vanderbilt course, his pit managers insisted upon holding him down to safe limits, and he drove only to win his race.

Another Road Race Victim

Savannah, Ga., Nov. 14—Special telegram—Death claimed another road race victim today when W. H. Sharp, who had entered a Sharp-Arrow in the grand prix, died this afternoon in the Savannah hospital as the result of injuries sustained last Thursday when his car ran off the course, killing his mechanic, Albert Fuchs. The cause of Mr. Sharp's death was shock and rupture of the intestines. He was operated upon this morning and apparently came through in good condition. Two hours later however he had a relapse and passed away. Originally Mr. Sharp was a photographer at Trenton, N. J., but gave up that business to manufacture motor cars at Stroudsburg, Pa. It will be remembered that the Sharp-Arrow, driven by Mr. Sharp won a sweepstakes at the opening meet of the Long Island motor parkway.

CARS, WHICH WAS WON BY BILLY KNIPPER IN A LANCIA, WITH WITT IN E-M-F SECOND

Motor		Lap 1	Lap 2	Lap 3	Lap 4	Lap 5	Lap 6	Lap 7	Lap 8	Lap 9	Lap 10	Lap 11	Miles per hr.
		17.3	34.6	51.9	69.2	86.5	103.8	121.1	138.4	155.7	173.0	190.3	....
Lancia	Elapsed time..	18:10	35:45	53:15	70:42	88:08	105:44	123:18	140:38	158:28	176:52	199:22.67	57.27
	Lap time.....	.....	17:35	17:30	17:27	17:26	17:36	17:34	17:20	17:50	18:24	18:30	....
E-M-F	Elapsed time..	18:30	36:40	54:57	73:08	91:08	109:09	127:10	145:05	162:52	185:30	206:34.22	55.11
	Lap time.....	.....	18:10	18:17	18:11	18:00	18:00	18:02	17:55	17:47	22:38	21:04	....
Maxwell	Elapsed time..	19:46	38:57	58:16	77:51	97:26	116:50	137:25	161:31	180:53	200:11	219:19.06	52.06
	Lap time.....	.....	19:11	19:19	19:35	21:35	19:24	20:35	24:06	19:22	19:22	19:18	....
Maxwell	Elapsed time..	20:35	40:42	60:26	80:05	101:18	121:19	141:01	160:34	180:09	199:48	219:23.24	52.04
	Lap time.....	.....	20:07	19:44	19:39	21:13	20:01	19:42	19:33	19:35	19:39	19:35	....
Maxwell	Elapsed time..	20:14	40:04	60:05	80:31	100:39	121:13	141:40	169:27	194:13	215:22	236:07.35	48.35
	Lap time.....	.....	19:50	20:01	20:26	20:08	20:34	20:27	27:47	24:46	21:09	20:45	....
E-M-F	Elapsed time..	19:18	46:11	Cracked cylinder									
	Lap time.....	.....	26:53										
Northway	Elapsed time..	20:55	40:35	Cracked cylinder									
	Lap time.....	.....	19:40										
Northway	Elapsed time..	19:35	Broke crankshaft										

SAVANNAH CUP WON BY DAWSON IN MARMON

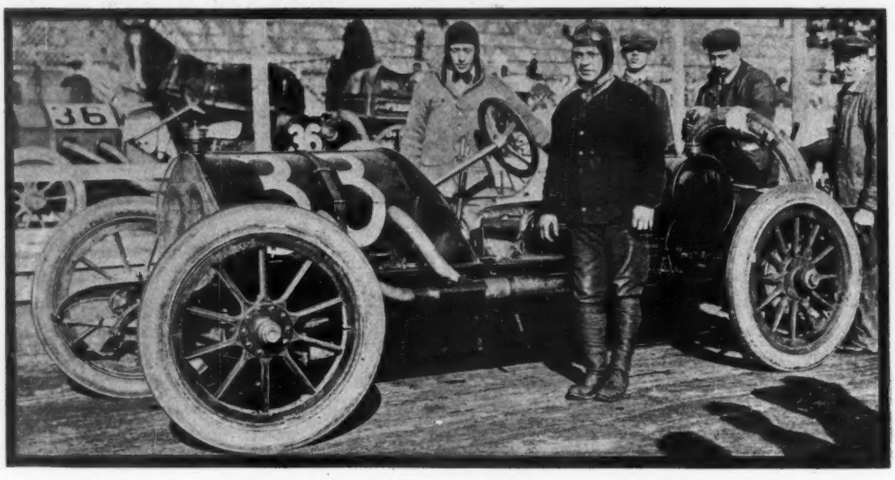
RESULTS OF 276.8-MILE RACE FOR THE SAVANNAH TROPHY, IN WHICH THE 231-300 CLASS CARS

Car No.	Car	Driver	Mechanician	Cyl	Bore and stroke	Mag.	Carb.	Drive Shaft	Tires	Rims	Radiator	Motor		Lap 1
36	Marmon.	Dawson ..	Keene	4	4 23-61x5	Bosch	Schebler	Shaft	Michelin	Michelin	Mayo	Marmon	Total time.	17.3
													Lap time.	16:20
33	Mercer..	Roebling II	Geshwantner	4	4⅜x5	Bosch	Schebler	Shaft	Michelin	Michelin	.....	Own	Total time.	.....
													Lap time.	17:19
31	Falcar ..	Hughes ..	Armsburger.	4	4⅛x5¼	Bosch	Excelsior	Shaft	Michelin	Continental	McCord	Excelsior	Total time.	.....
													Lap time.	18:01
32	Marmon.	Heinemann	Patton	4	4½x4½	Bosch	Schebler	Shaft	Michelin	Michelin	Mayo	Marmon	Total time.	.....
													Lap time.	16:59
35	Falcar ..	Gelnaw ...	Johnson ...	4	4⅛x5¼	Bosch	Excelsior	Shaft	Michelin	Continental	McCord	Excelsior	Total time.	.....
													Lap time.	17:12
37	Falcar ..	Pearce ...	O'Brien	4	4½x5¼	Bosch	Excelsior	Shaft	Michelin	Continental	McCord	Excelsior	Total time.	.....
													Lap time.	17:40

SAVANNAH, GA., Nov. 11—If Joe Dawson needed any further proof of his right to be ranked among the real classy drivers of the racing game, the race he won in the Savannah trophy contest, held coincidentally with the running of the Tiedeman trophy today, furnished that evidence in abundance. Not alone in skilful handling of his Marmon did he shine, but in downright clever generalship he was the star of the light-car races.

Furnishing an international record for cars of his class, Dawson won this 276.8-mile event in 4 hours, 23 minutes, 39.98 seconds, or at a general average of 62.75 miles per hour. Washington Roebling, in a Mercer, was second, in 4 hours, 35 minutes, 25.25 seconds, followed by Hugh Hughes, in a Falcar, in 4 hours, 46 minutes, 11.34 seconds. These were the only cars to finish, although Heinemann's Marmon was running when the race was stopped.

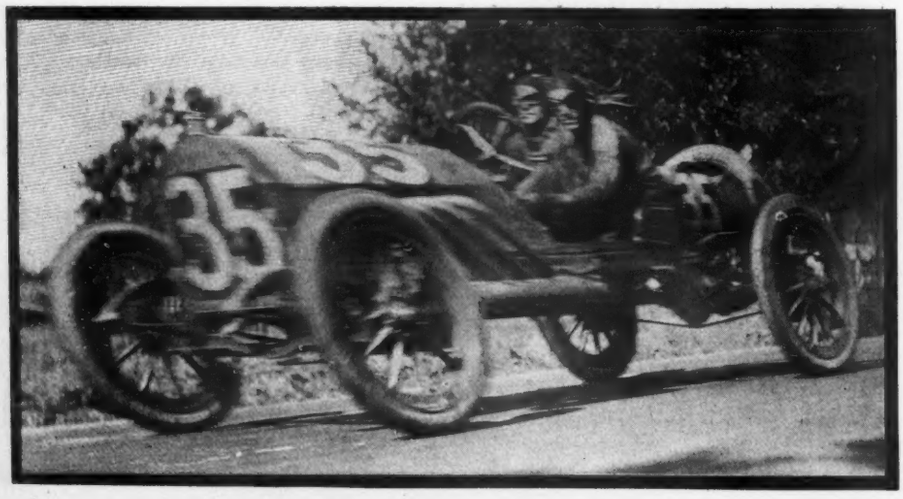
Dawson's second lap in 16:10, or at the rate of about 64 miles per hour, was the fastest of the race, and it served to give him such a good lead that he never duplicated it again during the entire race. Starting fifth, Dawson took the lead on the long back stretch on Ferguson avenue, about three-quarters the way around, and from that time on never was headed. He hit up his pace strong for a little over two laps, and then he simply maintained a safe lead, rather following the pace of Roebling, in the Mercer, whom he had to beat to win. Like a general, he kept his eye on the Mercer, and, timing his every move, drove steadily without a stop of any sort. His fastest lap was, as stated before, 16:10 and his slowest 16:45, the first the second lap and the latter the third—just 35 seconds difference in 17 miles, and outside of these two the difference was but about 10 or 12 seconds average.



ROEBLING IN THE MERCER WHICH FINISHED SECOND

Seven cars were entered to start in this event but, unfortunately, the Pullman entry was tied up in the railroad yards and did not reach the course in time to make ready for the race. Withdrawal was announced the night before, after 3 days of fruitless effort to get the railroad company to move fast. Of the six starters, only three finished, two of the Falcars succumbing to mechanical troubles.

Hugh Hughes was the first away, and his start from the wire opened the 2 days' meet, as all the Savannah trophy entries preceded those of the smaller cars in the Tiedeman event. With Will Armsburger at his side, Hughes negotiated the first lap in last place, moving up a notch in the second and maintaining fifth till the ninth, when Gelnaw went out. This gave Hughes fourth. As Pearce also dropped shortly after Gelnaw, Hughes moved into third,



GELNAW IN FALCAR, SAVANNAH CUP CAR, AT HIGH SPEED

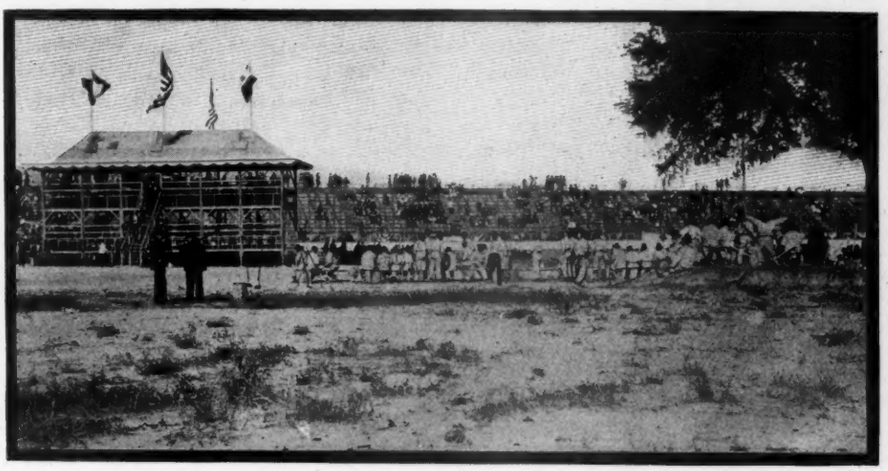
FASTEST LAPS IN BIG RACE

No.	Car	Driver	Lap	Time	Miles per hr.
	GRAND PRIX				
10	Fiat	Nazzaro .	7	13:42	76.6
18	Benz	Haupt ...	10	13:43	76.6
			11	13:43	76.6
16	Fiat	Wagner ..	11	13:49	76
9	Benz	Hemery .	3	13:50	75
15	Benz	Brown ...	13	14:01	74
19	Fiat	De Palma	21	14:04	73.7
3	Marquette-Buick ...	Chevrolet.	3	14:10	73.2
17	Marquette-Buick ...	Burman .	12	14:20	72.4
8	Marmon ...	Dawson ..	4	14:30	71.7
4	Lozier	Mulford .	9	15:17	67.9
12	Lozier	Horan ...	24	15:53	65.3
7	Alco	Grant ...	3	15:24	67.3
14	Marmon ...	Harroun .	15	15:45	65.9
6	Pope-Hartford	Basle	6	15:53	65.3
13	Pope-Hartford	Disbrow .	8	16:14	63.9

MERCER FINISHES SECOND AND FALCAR THIRD

COMPETED, WHICH WAS WON BY JOE DAWSON IN A MARMON, WITH ROEBLING'S MERCER SECOND

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	M.P.H.
34.6	51.9	69.2	86.5	103.8	121.1	138.4	155.7	173.0	190.3	207.6	224.9	242.2	259.5	276.8	
32:30	49:15	65:48	82:10	98:40	115:08	131:38	148:19	164:58	181:37	198:02	214:33	230:48	247:08	263:39.98	62.75
16:10	16:45	16:33	16:22	16:30	16:28	16:30	16:41	16:39	16:39	16:25	16:31	16:15	16:20	16:21	
33:55	50:36	67:08	83:32	100:02	116:29	134:51	151:42	168:13	184:46	201:26	218:03	234:25	250:47	275:25.25	60.11
16:36	16:41	16:32	16:24	16:30	16:27	18:22	16:51	16:31	16:33	16:40	16:37	16:22	16:22	24:38	
35:32	53:01	70:52	88:29	105:59	123:38	141:13	158:48	176:10	193:39	211:08	228:29	246:05	268:35	286:11.34	58.03
17:31	17:29	17:51	17:37	17:30	17:39	17:35	19:35	17:22	17:29	17:29	17:21	17:36	22:30	17:36	
36:12	66:26	95:23	112:02	128:39	145:08	161:39	178:16	194:51	211:31	228:07	244:44	Running			
19:13	30:14	28:57	16:39	16:37	16:29	16:31	16:37	16:35	16:44	16:36	16:37				
33:52	50:32	67:11	83:49	100:28	117:01	133:40	Broke tie-rod								
16:40	16:40	16:39	16:38	16:39	16:33	16:39									
34:50	51:54	69:01	86:01	105:55	123:05	140:10	Broke rear wheel								
17:10	17:04	17:07	17:00	19:54	17:10	17:05									



CONVICTS GIVEN HOLIDAY WATCH THE SMALL RACES

where he held to the finish. His time was slow all the way, but he drove uniformly, negotiating all the turns with ease. His first stop was in the fourteenth lap, when he took on gasoline. As he attempted to leave the pits his clutch stuck, and he lost over 2 minutes getting his gears shifted. Just a quarter of a mile further on he tried to clear into high, but his gears could not be shifted and he was forced to stop a few seconds before proceeding.

Lou Heinemann and Harry Patton started second in the smaller Marmon and finished the first lap in that order, second only to Dawson. But Heinemann was getting too rich a mixture, which slowed him down on the second lap and he was forced to stop at the pit for adjustment. Continued carbureter trouble cost him two very slow laps in the third and fourth, and when he finally did get to going right he was in last place.

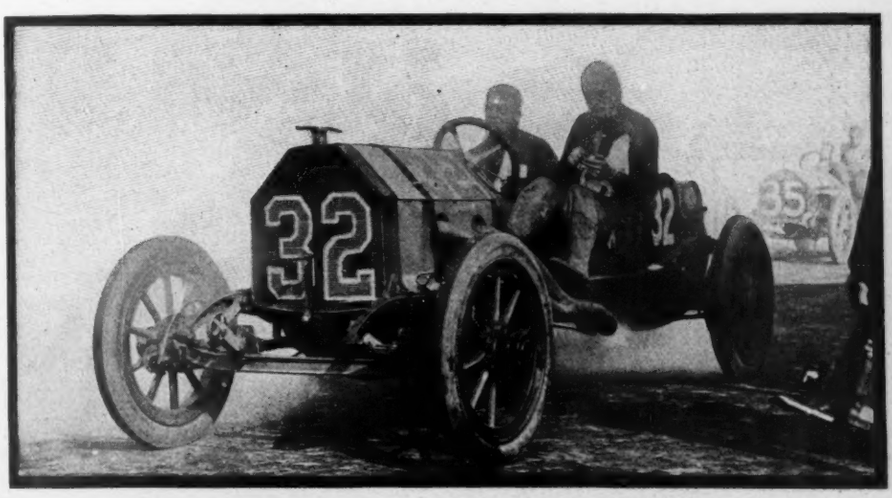
Roebling, in his Mercer, with Felix Geschwantner as mechanician, was third off and finished the first lap fourth, with Gelnaw and Heinemann ahead and behind Dawson. The next lap put the Mercer third and Roebling moved into second in the fourth by three seconds over Gelnaw. This position he held till the eighth lap, when he stopped for oil, gas and water, allowing Gelnaw to pass him. But Gelnaw went out on his ninth and Roebling took up second, which he held to the finish. In the sixteenth lap his goggles became so dirty and befogged that he misjudged the turn on Norwood avenue and went off the road. He slewed into a palmetto tree, striking it with his emergency brake lever at its lower end, breaking off one of the rods and putting it out of commission. His entire lever slot plate was badly bent, and he wound up in a sand spit. It took him 5 or 6 minutes to get the car back onto the road, but he finished running well. Roebling had poor pit arrangements, and after his first stop never had any signalling facilities.

Frank Gelnaw and L. Johnson started fourth and finished the first lap third. Up till the last end of the eighth lap they held second and third, with Roebling, but at Bonna Bella, about three-quarters around, the tie bar broke and, after wabbling along the track a short distance, the car plunged into and through one sand bank and into another, where it stopped with no injury to the men.

W. H. Pearce and Frank O'Brien started last, finishing the first lap fifth and moving into fourth the second time around. This position they held till they reached Burnside, the hairpin turn at the lower end of the course. Trying to take this turn at speed, Pearce tore off the left rear wheel, stripping the spokes clean at the hub and throwing his car over into the ditch. No one was hurt.

FASTEST LAPS IN SMALL RACES

No.	Car	Driver	Lap	Time	Speed M. P. H.
		SAVANNAH CUP			
36	Marmon ...	Dawson .	2	16:10	64.2
33	Mercer	Roebling .	15	16:22	63.4
32	Marmon ...	Heinem'nn	7	16:29	62.9
35	Falcar	Gelnaw ..	7	16:33	62.7
37	Falcar	Pearce ..	5	17:00	59.8
31	Falcar	Hughes ..	3	17:29	58.2
		TIEDEMAN CUP			
44	Lancia	Knipper .	18	17:20	58.7
45	E-M-F	Witt	9	17:47	58.2
41	E-M-F	Cohen ...	1	19:18	42.7
48	Maxwell ...	Costello .	8	19:33	42.2
47	Cole	Endicott .	1	19:35	42.2
43	Cole	Knight ..	2	19:40	42
42	Maxwell ...	Doorley ..	..	19:50	41.8



HEINEMANN IN MARMON WHICH WAS STILL RUNNING

MOTOR AGE
Published Weekly by
THE CLASS JOURNAL COMPANY
1200 MICHIGAN AVENUE, CHICAGO
NEW YORK OFFICE
239 West 39th Street
SUBSCRIPTION RATES
United States and Mexico
$3.00 per Year
Other Countries including
Canada $5.00
Entered as Second-Class Matter September 19, 1899, at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Trend of Foreign Design

ON another page of this issue the details of many European cars for the coming season are given and the general trends of construction commented upon. While it is true the foreign design is not studied so closely by American engineers as it was some years ago, it is nevertheless a fact that every designer, who has the ultimate perfection of the motor car at heart, cannot shut his eyes on what the engineer in other countries is doing. There was a time when many American engineers copied foreign designs entirely without stopping to maturely deliberate on whether such designs were best suited for American conditions or not. It is a further fact, however, that during the last 2 or 3 years this blind imitation has largely ceased and American designers are only doing what those designers of other countries are doing, namely, adopting those details which time has proven to be satisfactory and which experience has warranted to be adaptable to the local needs.

PERHAPS the greatest characteristic of British and Continental designs is the long-stroke motor. This has been in existence abroad in one degree or another for 4 years, but has not been imitated in America. The long-stroke motor has been developed in Europe because of tax conditions. There is a horsepower tax. The horsepower is rated on the bore of the cylinder. Manufacturers have aimed to build motors with the smallest possible bore and the only way to get power and still keep the diameter down is to lengthen the stroke. This is the big reason for the long-stroke motor. While this is the primary reason for its development designers have, nevertheless, developed this type of motor to a high stage of efficiency. It is a favorable comment on American engineers to know that they have not jumped to the long-stroke motor solely because Europe has adopted it, but that they have analyzed the situation and discovered the reason.

THE recent Olympia show, held in London, at which practically every European make was exhibited, revealed many important trends of construction, some of which like the long-stroke motor have been brought about by circumstances whereas others have their foundation on the best engineering principles, irrespective of road conditions, local taxation, or the price of fuel. Perhaps nothing is more noticeable than the question of silence in the motor and car in general. The day of the noisy car is over. In order to reduce noise not a few manufacturers are using a silent chain to transmit from the crankshaft to the camshaft instead of the gearing heretofore generally used. The chain is quieter and it has proven satisfactory. The sliding valve has not progressed during the year as anticipated, although the Knight type is gaining in public estimation. It is doubtless the silence of this motor which has resulted in the reduction of noise in many poppet-valve types. The manufacturer of the poppet-valve motor was compelled to meet the slide-valve type. To do this in efficiency brought in the question of larger valves which has resulted in additional power; and to meet the slide valve in the question of noise the chain-drive for the camshaft has come to hand as has the matter of entirely enclosing the valve stems and tappets, together with the introduction of such noise reducing features as fiber washers at the ends of the valve tappets. The reduction of noise has also been aimed at in the more efficient lubrication systems that have been adopted. The grease cup is now an integral part of every spring bolt.

The Life of Tires

IT is only when we are in receipt of accurate information that we are able to judge as to results. Criticism has been general on the question of tire wear and it is questionable if many of the critics have possessed that information they should have before entering on the field of criticism. No better opportunity has been afforded of accurately studying the tire situation than the recent 1,050-mile reliability contest of the Chicago Motor Club. In this contest twenty-three cars made the complete circuit, covering in all the grand total of 24,150 miles. Nine of the twenty-three cars did not have a minute's tire trouble from start to finish. This means 9,450 miles of travel free from tire worry. Of the twenty-three cars which traveled the 24,150 miles the total time given over to tire trouble was 515 minutes, or at the rate of 1 minute for each 47 miles traveled. These cars averaged 20 miles per hour, which is the legal speed limit of the state. As the start was made each morning at 6 o'clock there was considerable driving in the dark, so that the test might be considered a reasonably satisfactory one from all viewpoints The undoubted reason why nine cars made the complete circuit without tire trouble was the reasonable driving. The drivers realized that to average 20 miles per hour it is not necessary to travel 50 miles an hour part of the time and then waste time at a 10 or 15-mile-an-hour pace at other places. It is the average driving that counts, and the car owner who practices this will be amazed at how his tire life is increased.

IN contrast with this favorable tire report on the roads of Illinois, is the tire situation at the grand prize race over the Savannah course, a distance of 415 miles. In this distance one car made fifteen tire changes, or a tire change every 27 miles. It was unquestionably speed that caused this terrific destruction, and it may also have been due to the use of too small a tire size. Those who have made a careful study of the tire situation this year have discovered that up to a certain speed tires will endure continuous strain for a long period, but above this mark they give way rapidly. On the Indianapolis speedway the limit of tire wear seemed to be about 73 miles per hour. When racing cars averaged above this rate tires frequently had to be changed from 30 to 50 miles, whereas below this rate they have averaged 70 miles an hour for 200 miles.

IF it has been discovered that there is a point up to which cars will wear well in racing it is certain that there is a corresponding point up to which they will wear well in ordinary touring service. The results of the Chicago reliability have proven this. The car owner who takes curves too fast, strikes bridges at too rapid a pace, and tries to make 40 miles per hour over rough roads, must pay the tire bill. It has been remarked that the introduction of the demountable rim will tend to a greater carelessness in the use of tires. Before the demountable and quick-detachable were heard of, the work of changing a large tire in case of puncture or blowout acted as a curb on the driver, but now with the detachable-demountable the time of replacing a tire is minimized and the horror of a tire change has passed away. With many to whom tire upkeep is not a consideration the demountable will result in greater tire destruction, but to those owners who are compelled to look upon tire upkeep the same as the general maintenance of the car the demountable will not prove any stumbling block.

CHICAGO'S COMMERCIAL SHOW TO BE BIG ONE

CHICAGO, Nov. 14—The demand for space at the Chicago show is greater than ever. For the first week, January 28 to February 4, there are a dozen or more makers of cars and more than fifty makers of accessories on the waiting list. Nearly all of the big makers of commercial cars have secured space for the second week, February 6 to 11, and the main floors of the Coliseum and annex practically are full. The accessories section has been filled to the last foot. Of the members of the Motors and Accessory Manufacturers, who took 147 spaces the first week, all of the occupants of gallery spaces will stay through the entire show. Only twenty-nine spaces, in all, for the second week, were left vacant and these were filled immediately the Motor and Accessory Manufacturers' allotment was completed. Following is a list of the commercial car makers who have contracted for space, to be supplemented later by several to whom allotments have been made but who have not yet completed the formalities:

Mack Brothers Motor Car Co., Allentown, Pa.; Mais Motor Truck Co., Indianapolis, Ind.; U. S. Motor Truck Co., Cincinnati, Ohio; Hart-Kraft Motor Co., York, Pa.; White Co., Cleveland, Ohio; Studebaker Brothers Mfg. Co., South Bend, Ind.; Alden Sampson Mfg. Co., Pittsfield, Mass.; Courier Car Co., Dayton, Ohio; W. H. McIntyre Co., Auburn, Ind.; Waverley Co., Indianapolis, Ind.; Reo Motor Car Co., Lansing, Mich.; Cartercar Co., Pontiac, Mich.; Grabowsky Power Wagon Co., Detroit, Mich.; Garford Co., Elyria, Ohio; Packard Motor Car Co., Detroit, Mich.; Avery Co., Peoria, Ill.; Pope Mfg. Co., Hartford, Conn.; Rapid Motor Vehicle Co., Pontiac, Mich.; Reliance Motor Truck Co., Owosso, Mich.; Peerless Motor Car Co., Cleveland, Ohio; American Locomotive Co., New York City; Pierce-Arrow Motor Car Co., Buffalo, N. Y.; Metzger Motor Car Co., Detroit, Mich.; H. H. Franklin Mfg. Co., Syracuse, N. Y.; Knox Automobile Co., Springfield, Mass.; Kissel Motor Car Co., Hartford, Wis.; Kelly Motor Truck Co., Springfield, Ohio; Adams Brothers Co., Findlay, Ohio; Chase Motor Truck Co., Syracuse, N. Y.; Chicago Commercial Car Co., Chicago, Ill.; Lansden Company, Newark, N. J.; Federal Motor Truck Co., Detroit, Mich.; Automobile Maintenance and Mfg. Co., Chicago, Ill.; F. B. Stearns Co., Cleveland, Ohio; Economy Motor Car Co., Joliet, Ill.; Anderson Carriage Co., Detroit, Mich.; Marquette Motor Vehicle Co., Chicago, Ill.; Monitor Automobile Works, Janesville, Wis.; Clark Delivery Car Co., Chicago, Ill.; Schmidt Brothers Co., Chicago, Ill.; Brodesser Motor Truck Co., Milwaukee, Wis.

An arrangement has been entered into between the Motor Cycle Manufacturers' Association, represented by E. S. Fretz, president, and George M. Hendee, chairman of the show committee, and the management of the Chicago show, under which space is to be set aside for a motor cycle section, in which the members of the Motor Cycle Manufacturers' Association will exhibit in a body. The motor cycles will form a part of the display during the second week of the show, opening February 6 and closing on the 11th. Other exhibits that week will consist of pleasure cars which cannot find room the first week, commercial cars of all kinds and accessories. The motor cycle section will consist of 3,500 square feet of space on the main floor of the Coliseum annex, enough to provide for about twenty exhibits. All makers of motor cycles are to be placed in this section, whether members of the M. C. M. A. or not.

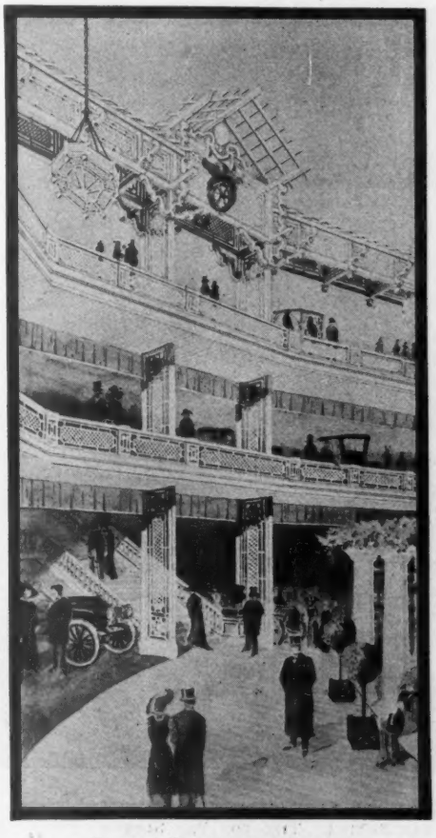
Practically All Space in Coliseum and Annex Has Been Applied for by Truck People

GROWTH OF THE A. A. A,

New York, Nov. 14—When the annual meeting of the American Automobile Association convenes at the Hotel Belmont in New York city on November 30 and December 1, the report of the membership committee will show a total closely approaching 34,000. Several additional state associations are practically assured, the most recent applicant being the Idaho State Automobile Association, which will include clubs in Boise, Twin Falls, Idaho Falls and Montpelier. Robert W. Spangler is the one who has been carrying on the organization work so successfully. New Hampshire will be another newcomer to the national list, and President L. R. Speare, who is a summer resident of that state, has particularly interested himself in the work there. The largest club in Tennessee, the Memphis Automobile Club, has notified the A. A. A. board of directors that its application will be in for action at the annual meeting, and the clubs at Nashville and Knoxville have given assurances of participating in the formation of a state association in the near future.

Georgia now has available the three clubs necessary to start a state body, two of which, the Savannah Automobile Club and the Floyd County Automobile Association of Rome, already are unfederated members of the A. A. A. Leonard Tufts, the well-known good roads advocate, is aiding in North Carolina to form a state association there, and South Carolina is another prospective, with the clubs in Columbia and Charleston particularly active. The south, more than any other section of the country, appreciates the value of good roads, for the tourists follow in their wake, and the fact that the fourth national good roads convention is likely to take place in Atlanta further accentuates the awakening of the south to the value of highway improvement.

Preliminary to the recent election, the Pennsylvania Motor Federation, through its clubs and affiliated good roads organization in that state, communicated with the candidates of all parties in regard to highway measures to be introduced at the coming session of the Pennsylvania legislature. The majority of replies received indicate a favorable attitude towards highway legislation. In other parts of the country the A. A. A. state associations and clubs figure prominently in the good roads results sought, and the whole trend of national sentiment shows that the owners of motor-driven vehicles must carry on a large part of the work in order to secure satisfactory good roads laws.



GARDEN DECORATIVE SCHEME

GARDEN SHOW PREPARATIONS

New York, Nov. 14—A partial investigation of the preparatory work being done in order to decorate Madison Square garden for the eleventh show, under the auspices of the Association of Licensed Automobile Manufacturers, January 7 to 21, is astounding. At a carpenter shop in New York city two entire floors are given over to getting ready the lattice work which is to be used extensively throughout the main floor of the garden along the sides. The lattice work is being done in sections which are numbered so as to be fitted properly when joined. More than 7,000 square yards of carpeting are to be used to cover the exhibition spaces on the main floor and elevated platforms. The carpet is of a special weave of light green and will lend something toward an effect of the cars being on grass. It is now being cut up and sewed into proper lengths. Fifty men are working on the sign posts which are to mark the car exhibits. Hundreds of other craftsmen are engaged on rustic work, plaster effects, etc. White and gold are the colors selected to predominate in the decorative scheme, and while these colors will be most prominent, green and crimson will be strongly in evidence.

CHICAGO 1000-MILE RELIABILITY TEST

No. 104, Moline, Driven by Van Dervoort, Tied for Van Sicklen Cup
No. 100, Falcar, Driven by C. F. Van Sicklen, Tied for Van Sicklen Cup
No. 106, Moline, Driven by J. A. Wicke, Tied for Van Sicklen Cup

Falcar and Two Molines Tie for Van Sicklen Cup in Roadster Class-No. 7 Haynes Touring Car Wins the Stewart Speedometer Bronze Trophy

CHICAGO, Nov. 14—Originator of many good things in the way of reliability runs, the Chicago Motor Club repeated its success of previous years when last week it ran off its 1,000-mile endurance test at the rate of 200 miles a day over the country roads of the central part of Illinois. Of the thirty-two cars originally entered twenty-nine started, twenty-three finished, and of this field only three had perfect scores after the technical committee finished its work yesterday afternoon in the Van Dyke commercial garage at 2441 Cottage Grove avenue. As a result of the judges' scrutiny it was declared that the winner of the Stewart speedometer trophy in the touring car division was the No. 7 Haynes driven by Williams, which drew a penalization of 2 points in the technical examination because of the loss of an anti-rattler bolt from the right rear brake.

Three Perfect Scores

It was not so easy to settle the winner of the Van Sicklen cup, offered by N. H. Van Sicklen, Sr., in the roadster and toy tonneau division, for it was in that section that the three perfect road and technical scores were developed. Participating in this glory were No. 100 Falcar, driven by Charles F. Van Sicklen, son of the donor of the cup; No. 104 Moline, driven by C. H. Van Dervoort, and No. 106 Moline, of which J. A. Wicke was the pilot. Not a flaw could be found in the score of any one of the trio and the judges were forced to call it a draw so far as they were concerned.

No one wanted to run off the tie because of the uncertainty of the weather at this time of the year, so the entrants

The Penalties Imposed in

No. 1—Abbott-Detroit: Broken mud apron, 5 points; loose oil cup, 1; two broken lamp brackets, 12; total, 18 points.

No. 4—Cunningham: Left rear spring seat bearing nut loose, 1; broken lamp bracket, 6; total, 7.

No. 7—Halladay: Lost mud apron nut, 1; lost nut on left front fender bracket, 1; lost bolt steering column clamp, 2; lost screw in clutch, 2; total, 6.

No. 7—Haynes: Anti-rattler on rear brake lost, 2; total, 2.

No. 8—Henry: Loose fender, 2; two loose spring clips, 2; list floor board, 2; total, 6.

No. 9—Imperial: Loose body bolt, 1; loose rivet, 1; fan belt off, 2; loose nut radiator support, 1; total, 5.

No. 10—Glide: Four loose frame rivets, 4; radiator beading loose, 1; water leak, 1; magneto and commutator controls broken, 10; no reverse, 25; lost spring seat bolt, 2; broken mud apron, 5; loose lock nut, 1; broken gear box, 250; total, 299.

No. 11—Abbott-Detroit: Left front wheel bearing loose, 5; water leak, 1; mud apron fastener lost, 1; lamp bracket broken, 6; total, 13.

No. 12—Cino: Water leak, 1; total, 1.

RETURNS THREE CARS WITH PERFECT SCORES

Cunningham Captures Standard Oil Cup in Fuel Economy Competition-Moline Takes Team Emblem-Michelin Tire Lands the Branstetter Trophy

of the cars involved came to an amicable agreement whereby the Moline company will hold the cup two-thirds of the time for the ensuing year and the Fal company the remainder. In addition Mr. Van Sicklen will give miniature cups to the three cars as souvenirs of the work in this year's contest. Next year two Molines and a Falcar will fight to see which one is to be credited with having won the first leg of the trophy. Under the terms of the deed of gift, this cup has to be won three times, the car with the best aggregate score for the three contests to eventually get it.

Other Cups Awarded

The Stewart speedometer and Van Sicklen cups were not the only trophies decided by this contest. There was a Chicago Motor Club cup given as a team prize for the team of the two cars of the same make having the best aggregate score regardless of class. As the Moline company had two perfect score cars in the roadster division, the cup goes into the Van Dervoort cabinet without question.

The Standard Oil trophy, hung up for the second time by the big corporation, resulted in one of the truest economy tests ever held, the results showing more conclusively what cars can do in the way of fuel economy in a give-and-take run extending over 1,050 miles of roads than any affair of the sort held during the year. Because of the reliability feature of the contest the drivers did not dare risk penalization in that department by making a too fine adjustment on the carbureter, for too thin a mixture would have made involuntary motor stops a menace. Under these rigorous conditions the Cunningham,

The Technical Examination

No. 101—Midland: Loose mud apron, 2; spring shackle shield off, 2; inoperable bonnet fastener, 1; broken spring leaf, 5; total, 10.

No. 102—Grout: Water leak, 1; lost motor bolt, 2; three bolts lost from vertical motor shaft housing, 6; total, 9.

No. 105—Lion: Inoperative cutout, 1; total, 1.

No. 107—Case: Loose rear muffler support stud, 1; right rear fender iron broken, 6; total, 7.

No. 108—Imperial: Broken rear axle truss rod, 5; two broken terminals, 4; total, 9.

No. 110—Speedwell: Loose spring seating bolt, 1; loose mud apron bolt, 1; total, 2.

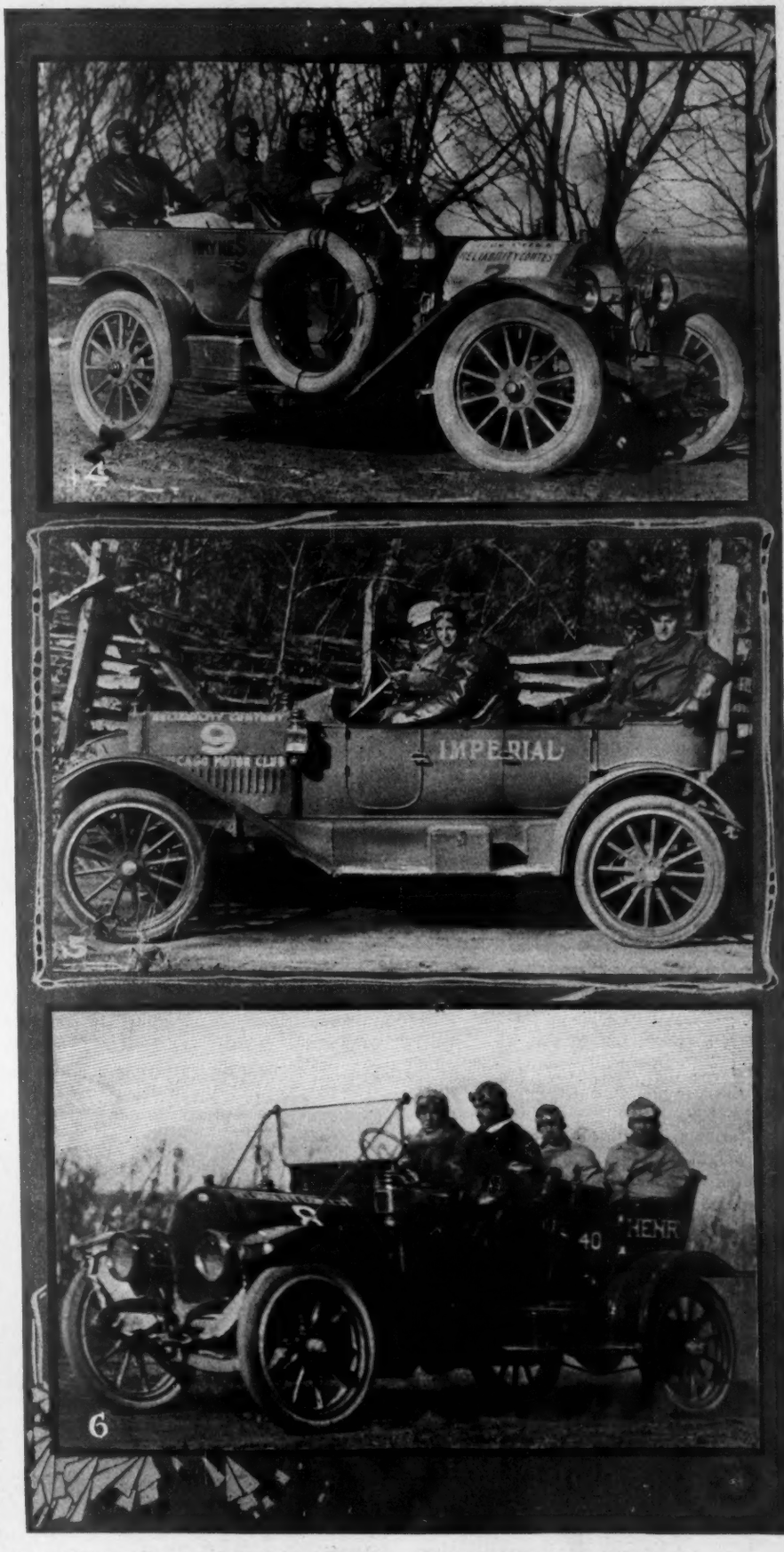
No. 111—Halladay: Lost fan belt, 2; water leak, 1; broken ignition control, 5; two broken lamp bracket, 12; total, 20.

No. 112—Staver-Chicago: Loose hub cap, 1; loose motor bolt, 1; total, 2.

No. 113—Staver-Chicago: Broken lamp bracket, 6; total, 6.

No. 117—Haynes: Muffler tail pipe clip sheared off, 1; total, 1.

No. 119—Moline: Loose lock nut on strut rod, 1; broken strut rod, 25; inoperative fan, 2; broken fan, 1; radiator leak 2; total, 31.



No. 7, Haynes, Driven by Williams, Winner of Stewart Speedometer Trophy
No. 9, Imperial, Driven by Funderburk, Second in Touring Car Class
No. 8, Henry, Driven by De Mange, Third in Touring Car Class

CUNNINGHAM, DRIVEN BY EMERY, WINNER OF FUEL ECONOMY PRIZE

TABLE SHOWING AMOUNT OF GASOLINE CONSUMED ON TOUR

Car No.	Car	Make of Carbureter	1st day	2d day	3d day	4th day	5th day	Gals. Total
1	Abbott-Detroit	Mayer	17.25	16.00	14.50	15.00	21.60	84.85
4	Cunningham	Stromberg	17.00	15.00	10.00	20.00	21.8	83.80
6	Halladay	Schebler	18.00	14.00	20.50	19.75	23.00	95.25
7	Haynes	Schebler	13.00	18.00	17.00	19.00	21.20	88.20
8	Henry	Excelsior	10.00	18.00	20.00	15.00	18.70	81.70
9	Imperial	Rayfield	14.00	22.00	19.00	13.5	18.8	87.30
10	Glide	Schebler	17.00	20.00	19.00	20.5	22.3	98.80
11	Abbott-Detroit	Mayer	15.00	14.00	15.00	16.5	17.5	78.00
12	Cino	Stromberg	15.00	14.25	19.00	18.00	21.60	88.85
100	Falcar	Rayfield	10.00	10.00	10.00	15.00	15.00	60.00
101	Midland	Rayfield	18.5	14.00	15.00	15.00	17.5	80.00
102	Grout	Stromberg	14.00	16.00	15.00	15.00	21.25	81.25
104	Moline	Schebler	14.00	13.00	14.00	13.00	16.4	70.40
105	Lion	Stromberg	17.00	16.00	18.00	17.00	18.75	86.75
106	Moline	Schebler	11.00	13.00	11.25	14.00	16.6	65.85
107	Case	Stromberg	22.00	23.00	22.00	23.5	16.6	107.10
108	Imperial	Rayfield	10.00	13.00	14.00	14.00	16.6	67.60
110	Speedwell	Schebler	17.00	13.00	25.5	17.00	34.5	107.00
111	Halladay	Schebler	16.00	15.00	14.25	15.00	16.00	76.25
112	Staver	Kingston	13.00	13.00	15.00	17.00	17.1	75.10
113	Staver	Kingston	13.00	14.00	13.00	13.75	15.50	69.25
117	Haynes	Schebler	10.00	10.00	15.00	18.00	20.9	73.90
119	Moline	Schebler	9.00	17.00	14.00	17.00	19.4	76.40

driven by J. C. Emery, local representative of the Rochester-made car, beat out the big field and captured the cup. Weighing 2,930 pounds, the Cunningham used 83.80 gallons of gasoline on the tour, which gave it a percentage of .459, which means that the Cunningham carried .459 pound for 1,050 miles on 1 gallon of gasoline. The Falcar, which finished second under the formula, which consisted of dividing the weight of the car by the amount of gasoline consumed as expressed in ounces, was second, with .425, while it also had the honor of using the least amount of gasoline on the tour, the observer's reports showing that 60 gallons were consumed, which gave the Falcar better than 17 miles per gallon in actual consumption.

The tire people also were given recognition by the Chicago Motor Club, and not the least interesting feature of the contest was the battle for the Branstetter cup, which was awarded to the Michelin Tire Co., which had two sets of tires in the tour. One of these was on the Falcar and the other on the Jones Case. Neither set suffered a puncture on the tour, but 15 points' penalty was charged against the Michelin company because Jones took off his steel-studded tires for the brake test. It is interesting in this connection to note that none of the perfect score cars—the two Molines and the Falcar—had a tire change on the trip. Results in this contest were computed only from the cars which finished the run. The winner was determined by computing the average penalty for each tire, which means the average fraction of a minute which is spent on each tire. Under this formula the results of the tire test were as follows:

Car	Sets	Penalty	Percentage
Michelin	2	15	1.87
Firestone	3	23	1.91
Goodrich	3	29	2.41
Diamond	10	213	5.32
Kelly-Springfield	2	102	12.7

The Goodrich cup also went to the Haynes company in a walkover. This trophy was offered to the winner of the roadster division in the 1908 reliability. The Haynes, Premier and Franklin tied for it with perfect scores and the understanding was that the tie would be run off in the club's next reliability. The club, however, did not hold a contest last year so it remained for this recent event to decide it. Neither the Premier nor the Franklin made an entry.

The tour was finished Friday afternoon, when the contestants made a 240-mile run from Champaign to Chicago. The end of the trip showed that fifteen of the cars had made perfect road scores. In the touring car class the clean ones were No. 4 Cunningham, No. 7 Haynes, No. 8 Henry, No. 9 Imperial and No. 12 Cino. The perfect score roadsters were No. 100 Falcar, No. 102 Grout, No. 104 Moline, No. 105 Lion, No. 106 Moline, No. 110 Speedwell, No. 111 Halladay, No. 112 Staver-Chicago, No. 113 Staver-Chicago and No. 117 Haynes. The brake tests, which were held Saturday morning, however, eliminated several of these clean ones. The Cino was put out with 7 points, the Grout got 25, the Lion 5 and the Speedwell 110. In addition the Lion and the Grout each was penalized 5 points in the clutch test. This left eleven cars for the consideration of the technical committee.

Eight Cars Eliminated

Calipers and fingers discovered flaws and weaknesses in eight of the surviving eleven. None of the touring cars was left with a clean score, but in the roadster class the two Molines and the Fal-

SPEEDWELL WHICH WENT THROUGH WITH PERFECT ROAD SCORE

car defied the efforts of the technical committee to find anything loose or broken. In all the committee examined twenty-three cars, those not given consideration being the six that were withdrawn during the tour, which included the No. 114 Case, No. 115 Krit and No. 118 Hupmobile, which withdrew at the end of the second day; No. 2 Haynes and No. 103 Hupmobile, which pulled out at the end of the third day, and No. 116 Brush, which dropped out at Kankakee on the fifth day with a broken crankcase.

The brake and clutch test proved interesting and developed twelve perfect scores in brakes and all but two in clutches. No. 6 Halladay, No. 7 Haynes, No. 8 Henry, No. 9 Imperial, No. 100 Falcar, No. 101 Midland, No. 104 Moline, No. 106 Halladay, Nos. 112 and 113 Staver-Chicago, No. 117 Haynes and No. 119 Moline all stopped within the required 50 feet with both foot and emergency brakes. The Grout and the Lion were the only ones with slipping clutches. The clutch test consisted of placing the front wheels against an 8-inch curb and asking the driver to either climb the curb, kill his engine or spin his wheels in order to demonstrate the soundness of the clutch.

Other Penalizations

In the technical examination only two cars developed any looseness in the engine, those being the Grout, which drew 8 points, and the 112 Staver, which got 1 point. Seven of them were penalized for water leaks—No. 9 Imperial, Glide, No. 11 Abbott, Cino, Grout, No. 111 Halladay and No. 119 Moline. All had clean scores so far as lubrication and carbureters were concerned, but five were caught napping on ignition. The Glide, Cino, No. 108 Imperial, Speedwell and No. 111 Halladay failed to hit on all four cylinders when subjected to the test. Most of the penalizations were recorded following the examination of the running gears, there being only five cars—the Cino, Falcar, Grout, No. 104 Moline and No. 106 Moline —which were perfect.

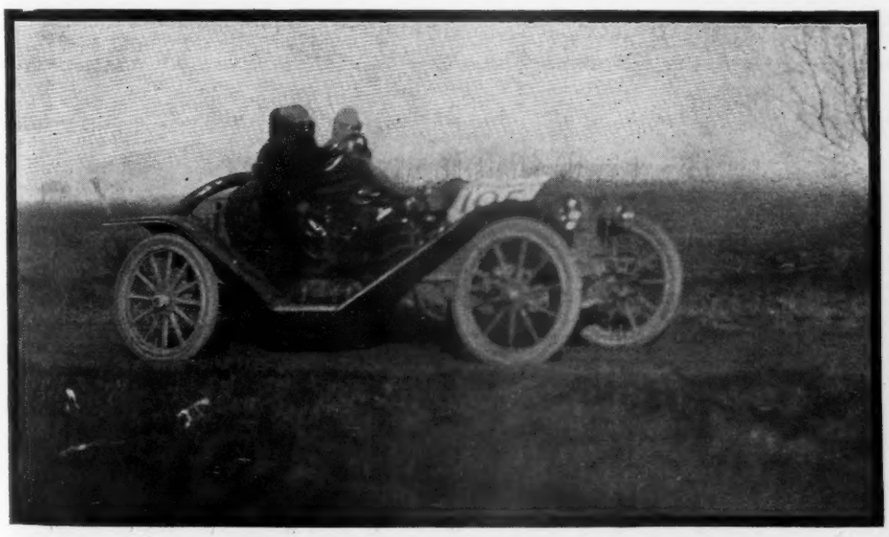
TWO STAVER-CHICAGOS WHICH HAD PERFECT ROAD SCORES

TABLE SHOWING THE TIRE TROUBLES OF THE CONTEST

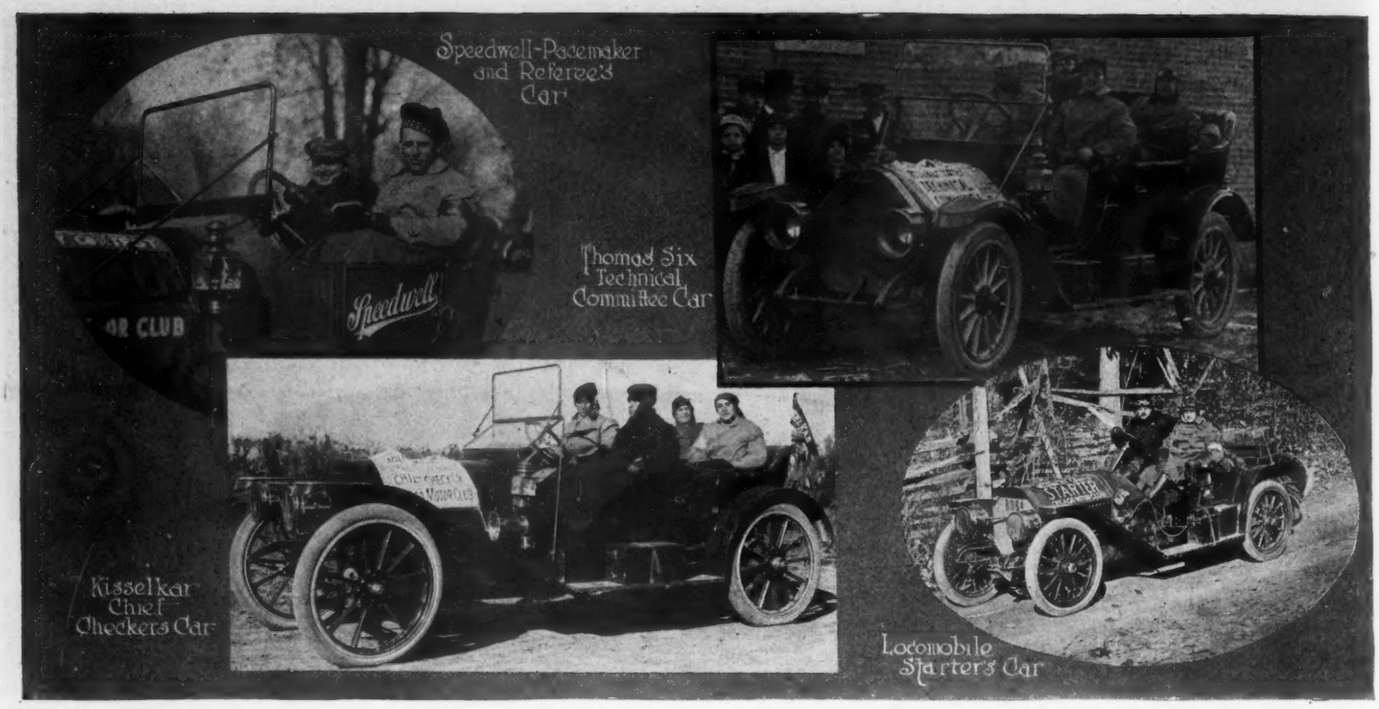
Car No.	Car	Make of tire	1st day	2d day	3d day	4th day	5th day	Min. Total
1	Abbott-Detroit	Diamond	0	0	0	0	0	0
4	Cunningham	Diamond	27	0	0	0	0	27
6	Halladay	Diamond	0	0	0	0	0	0
7	Haynes	Diamond	22	1	9	0	0	32
8	Henry	Empire	0	0	40	26	0	66
9	Imperial	Kelly-Springfield	0	0	0	15	0	15
10	Glide	Goodyear	0	0	31	18	0	49
11	Abbott-Detroit	Diamond	19	0	0	31	54	104
12	Cino	Diamond	0	0	0	0	0	0
100	Falcar	Michelin	0	0	0	0	0	0
101	Midland	Firestone	7	0	0	0	0	7
102	Grout	Diamond	0	0	0	0	20	20
104	Moline	Firestone	0	0	0	0	0	0
105	Lion	Diamond	0	0	0	0	30	30
106	Moline	Firestone	0	0	0	0	0	0
107	Case	Michelin	0	0	0	0	15	15
108	Imperial	Kelly-Springfield	0	0	87	0	0	87
110	Speedwell	Diamond	0	0	18	0	0	18
111	Halladay	Diamond	0	0	0	0	0	0
112	Staver-Chicago	Firestone	0	0	0	0	16	16
113	Staver-Chicago	Firestone	0	0	0	0	0	0
117	Haynes	Diamond	0	0	0	0	0	0
119	Moline	Firestone	10	0	0	19	0	29

The report of the technical committee is most complete and furnishes much food for thought for those who care to probe into it. For instance, it shows that there were only two cases of broken springs among twenty-nine cars that started out on the run last Monday. One of these occurred on Monday when the Glide broke a front spring which, however, was not repaired until the next day. The other case was that of the Midland, which was discovered only when the technical examination was made and it wasn't very serious at that —simply a broken leaf. The tour brought out one fact, and that is that some of the manufacturers are not giving enough thought to the lamp brackets on which the headlights are carried. Four of the cars were penalized because of broken lamp brackets—the Cunningham, both the Abbott-Detroits and the No. 113 Staver. In the case of No. 1 Abbott, both lamp brackets broke on the final day of the run and added materially to the penalties of Brown. There were two cases of mud aprons being broken noted on the cards.

A study of the observers' reports shows that the first 2 days of the run were particularly hard on brakes. The trail did not run through very hilly country, but because of its winding nature there were many sharp turns, for which the careful driver applied the brakes. The constant repetition of this sort of work told in the long run and this doubtless accounts for the elimination of several perfect score cars in the brake test Saturday.



LION ROADSTER WHICH HAD CLEAN ROAD SCORE


Speedwell-Pacemaker and Referee's Car
Thomas Six Technical Committee Car
Kisselkar Chief Checkers Car
Locomobile Starter's Car

CARS THAT CARRIED THE OFFICIALS IN THE CHICAGO RELIABILITY RUN

In no other reliability run of the year was there any attempt made to keep track of the gasoline consumed by the contesting cars. However, the Chicago Motor Club tried this scheme 2 years ago and it proved so successful that it was repeated this time. As mentioned above, the Cunningham captured the Standard Oil trophy for the least gasoline consumption under the formula, but a survey of the whole field demonstrates the economy of the modern car. Not one of the twenty-three cars that were rated in this competition was under 30 horsepower, yet the average fuel consumption of the lot was 12.75 miles to the gallon, which might be regarded as a remarkable showing considering the nature of the roads over which the run was made. Doubtless this average could have been greatly increased had the drivers been seeking for fuel economy only, but the reliability phase was of greater importance, so the drivers burned up the gasoline in preference to taking chances of injuring their cars in swinging corners or taking bumps. Then again there were halts along the road caused by the pacemaker getting ahead of schedule and holding the cars immediately back of him. Of course none of the contesting drivers could shut off their motors, and during these several waits considerable fuel was burned.

Fuel Consumption on Tour

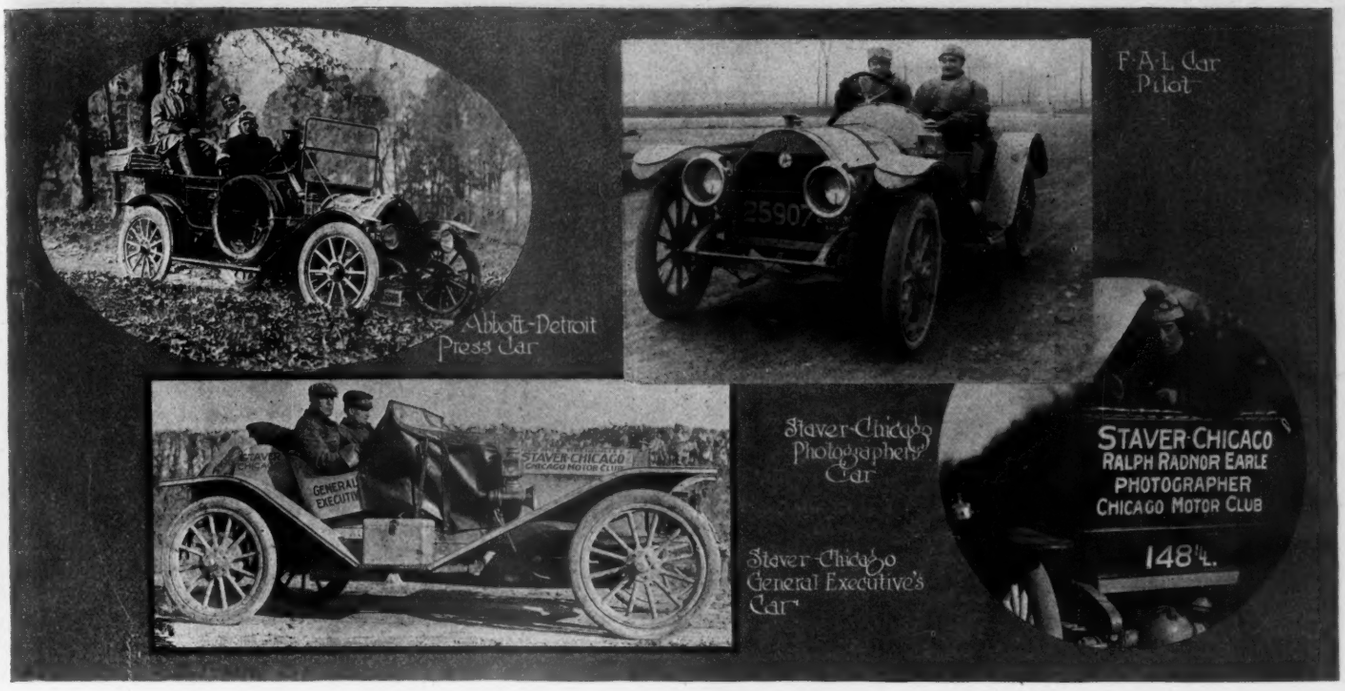
The figures show that on the first day, a distance of 195 miles, 330 gallons of gasoline were used. The second day and a shorter distance, 165 miles, the consumption ran higher, touching 351 gallons, which might be explained by the rough character of the roads on the Moline-Quincy stretch, which was the worst of the trip. The third day 380 gallons were used and the fourth, 390. Coming home from Champaign on the fifth day, a distance of 240 miles, the cars used up 440 gallons.

Swinging from gasoline to tires, the critic again finds most interesting data in the report made by F. E. Edwards, chairman of the technical committee. Nine of the twenty-three cars made the 1,050 miles without a tire change, which indeed is a remarkable showing. No. 1 Abbott-Detroit, No. 6 Halladay, No. 12 Cino, No. 100 Falcar, No. 104 Moline, No. 106 Moline, No. 111 Halladay, No. 113 Staver-Chicago, and No. 117 Haynes were the ones to avoid trouble in this way. There were twenty-one cases of punctures noted by the observers, the greatest sufferer being A. M. Robbins in No. 11 Abbott-Detroit, who had tire trouble the first, fourth and fifth day. On the first day he had two blow-outs in

REPORT OF THE CHICAGO MOTOR CLUB'S TECHNICAL COMMITTEE ON ITS FINDINGS IN THE

TOURING CAR DIVISION

Car No.	Car	Driver	1st day Time	1st day Tech.	2d day Time	2d day Tech.	3d day Time	3d day Tech.	4th day Time	4th day Tech.	5th day Time	5th day Tech.	Total road score
7	Haynes	Williams	0	0	0	0	0	0	0	0	0	0	0
9	Imperial	Funderburk	0	0	0	0	0	0	0	0	0	0	0
8	Henry	De Mange	0	0	0	0	0	0	0	0	0	0	0
12	Cino	Donnelly	0	0	0	0	0	0	0	0	0	0	0
4	Cunningham	Emery	0	0	0	0	0	0	0	0	0	0	1
11	Abbott-Detroit	Robbins	0	1	0	0	0	0	0	0	0	0	1
1	Abbott-Detroit	Brown	0	3	0	0	0	0	0	0	0	0	3
6	Halladay	Daubner	0	0	0	0	0	52	0	0	0	5	57
10	Glide	Cassell	0	0	0	66	0	0	0	0	0	0	66
	ROADSTER DIVISION												
100	Falcar	Van Sicklen	0	0	0	0	0	0	0	0	0	0	0
104	Moline	Van Dervoort	0	0	0	0	0	0	0	0	0	0	0
106	Moline	Wicke	0	0	0	0	0	0	0	0	0	0	0
117	Haynes	Wagner	0	0	0	0	0	0	0	0	0	0	0
112	Staver	Monckmeier	0	0	0	0	0	0	0	0	0	0	0
113	Staver	Duis	0	0	0	0	0	0	0	0	0	0	0
105	Lion	Bloomstrom	0	0	0	0	0	0	0	0	0	0	0
101	Midland	Nutting	0	0	0	2	0	0	0	0	0	1	3
111	Halladay	Aument	0	0	0	0	0	0	0	0	0	0	0
108	Imperial	Wells	0	0	0	0	4	10	0	0	0	2	16
102	Grout	Halbert	0	0	0	0	0	0	0	0	0	0	0
119	Moline	Salisbury	0	0	0	0	0	0	0	35	0	0	35
107	Case	Jones	0	0	0	0	0	0	0	0	22	50	72
110	Speedwell	La Chappelle	0	0	0	0	0	0	0	0	0	0	0



CARS THAT CARRIED THE OFFICIALS IN THE CHICAGO RELIABILITY RUN

his rear tires. On the first day's run only five of the twenty-three cars had tire trouble. The second day, despite the rough roads over which the cars traveled, No. 7 Haynes was the only one to have tire trouble. On the third day, five cars had to make changes of either casings or tubes, while on the fourth day there also were five. Five had trouble the last day.

Six cars withdrew from the tour at different points because of mishaps—two Hupmobiles, a Krit, Strang's Case, No. 2 Haynes and the Brush.

From Peoria to Champaign

When the tour left Peoria last Thursday morning on a run to Champaign there still were perfect sixteen cars, and the prospects of reducing the field so that a definite winner in each class could be secured seemed dubious. The day's run perhaps was the most enjoyable of the entire tour. The roads could not have been improved upon and fast time was made. On this leg the highways all were of dirt, and the tourists encountered mile after mile of going that reminded them of their boulevards in Chicago. It was no trick at all for those who desired to average 30 or 35 miles an hour, and the noon control was reached by the majority ahead of time. The dinner stop was at Decatur, which was reached by 10 o'clock in the morning, and at 11:15 the tourists retraced their steps from Decatur to Maroa, from which point they headed to Champaign. In order to go the distance, though, it was necessary to run from Champaign to Danville and return, which made twice during the day that the trail had to be retraced.

Only three cars were penalized for the day's run, No. 119 Moline, 103 Hupmobile and the Brush. The little one-cylinder car was charged 1 point for work on a fender, while the Hupmobile driven by Randall was forced to withdraw from the contest by radiator trouble. At Champaign, before going to Danville, Randall stopped at the Twin City garage and put on a new radiator and then formally withdrew from the contest, taking his 1,000 points with good grace. The penalization of No. 119 Moline robbed the perfect score brigade of one of its most prominent members. Salisbury played in hard luck in that his trouble was caused by his fan which cut two of the tubes of his radiator and caused a leak that required 35 points to mend.

That night at Champaign the judges revised their standing and thrashed out the motor stop question. There had been a misunderstanding regarding this point, some of the drivers being under the impression that the Glidden rule, which did

RECENT 1000-MILE RELIABILITY RUN THROUGH CENTRAL AND NORTHERN ILLINOIS

Total road score	FINAL EXAMINATION: Brake Tests: Brakes: Service	Brakes: Emerg.	Total brakes	Total clutch	Engine	Cooling	Lubr.	Carb.	Ign.	Mach. parts	Running gear	Grand total tech. & time penalties	ECONOMY COMPETITION: Gas. in gals.	Car weight	Pctg.
0	48 ft.	45 ft.	0	0	0	0	0	0	0	0	2	2	88.20	3590	.317
0	34	44	0	0	0	3	0	0	0	0	2	5	87.30	3560	.318
0	42	40	0	0	0	0	0	0	0	0	6	6	81.70	3710	.354
0	33	57	7	0	0	1	0	0	5	0	0	13	88.85	4000	.351
1	42	65	15	0	0	0	0	0	0	0	7	23	83.80	4930	.0459
1	66	55	21	0	0	1	0	0	0	0	12	35	78.00	3430	.343
3	68	52	20	0	0	0	0	0	0	0	18	41	84.85	3410	.313
57	42	43	0	0	0	0	0	0	0	2	6	65	95.25	3950	.323
66	70	63	33	0	0	2	0	0	10	276	11	398	....	....	...
0	37	41	0	0	0	0	0	0	0	0	0	0	60.00	3269	.425
0	37	41	0	0	0	0	0	0	0	0	0	0	70.40	3550	.393
0	35	40	0	0	0	0	0	0	0	0	0	0	65.85	3210	.3808
0	43	50	0	0	0	0	0	0	0	0	1	1	73.90	3170	.335
0	42	50	0	0	1	0	0	0	0	0	1	2	75.10	3040	.316
0	30	40	0	0	0	0	0	0	0	0	6	6	69.25	3040	.342
0	55	45	5	5	0	0	0	0	0	0	1	11	86.75	3590	.323
3	47	43	0	0	0	0	0	0	0	0	10	13	80.00	3680	.358
0	37	38	0	0	0	3	0	0	10	0	12	25	76.25	2540	.260
16	50	56	6	0	0	0	0	0	4	0	5	31	67.60	3070	.354
0	75	47	25	5	8	1	0	0	0	0	0	39	81.25	3960	.3807
35	36	45	0	0	0	5	0	0	0	0	26	66	76.40	3590	.317
72	73	46	23	0	0	0	0	0	0	0	7	102	107.10	3630	.264
0	44	160	110	0	0	0	0	0	5	0	2	117	107.00	3510	.256

CINO, WITH DONNELLY AT THE WHEEL, HAD PERFECT ROAD SCORE

not count a motor stop when the engine was restarted within a minute, was in force on this run. The judges, however, ruled otherwise, and because of their decision points were given No. 11 Abbott-Detroit and No. 108 Imperial. The judges also took away the point which had been charged against the Cunningham on the second day for tightening the cover of the gearbox. It seems that when oil was put in the gearbox Monday night the mechanic neglected to properly tighten the bolts. The referee ruled that there should be no penalization for the reason that this loose bolt could have been tightened at the next oiling without a penalty being exacted.

Krit Catches the Tour

The little Krit rejoined the tour at Champaign after a most exciting chase. This car smashed a front wheel 20 miles outside of Quincy, which put it out of the contest. A new wheel was ordered from Chicago, but it did not reach Clarence Buckwalter until Wednesday noon. Making the repairs, Buckwalter and his driver started Wednesday afternoon to catch up with the tour. They drove all that night and all day Thursday before they caught up. This run was remarkable in that it was a high-gear effort. A block of wood was intentionally placed in the gear quadrant so that only the high and reverse could be used.

In order to get into Chicago at a reasonable hour, the start from Champaign Friday morning was made at 5:30 o'clock, the tourists facing a journey of 240 miles. They found the roads between Champaign and Kankakee rough, and because of this the speed of the party was slowed considerably. After leaving Kankakee and squaring away for Streator, the noon stop, there was a sandy stretch which made the navigation somewhat hazardous. Because of the deep sand, there was considerable curiosity among the contestants to know how the Thomas six, the technical committee's car, which was making the run on high gear only, would make it, but Miller ran the big car through without apparent trouble, just as he had done all the way from the start in Chicago.

On this day's run No. 107 Case lost its perfect score. Jones was inside the city limits of Chicago when a pin on the magneto coupling sheared off, the same kind of an accident that put the other Case out the first day of the run. In fixing it, Jones drew 22 points. In addition this work made him late and he got 28 more points for this. The Case and the Imperial driven by Wells were the only two cars on the tour that were given time penalties on the tour.

Besides the Brush and the Case, three other cars were penalized in the final day. No. 6 Halladay was given 5 points for a carbureter adjustment, and the Midland got 1 point for the same thing. Wells in the Imperial was given 5 points for a stalled motor and for fixing battery connections.

Electrics Prove

PHILADELPHIA, PA., Nov. 11—Ranging along a mile or more of highways in Philadelphia and adjacent counties a column of thirty-nine electric pleasure cars paraded for 50 miles today in the first run ever given exclusively for this class. The run was promoted by the North American. Officials of the Quaker City Motor Club had charge of the administration of the run. R. E. Ross was referee.

In the column were twelve Woods cars, three Bakers, three Babcocks, nine Detroits, four Studebakers, one Clark, six Waverleys and a Rauch & Lang. Nine of the contesting cars were driven by women, all of whom finished the whole course.

The way was laid out through North Broad street to Fairmount park, over part of the course of the Fairmount park road race course to Ardmore and Bryn Mawr. Stop for luncheon was made at the Merion Cricket Club on the Lancaster pike, where an hour's control was established. A delightful buffet luncheon was served in the balcony dining room of the club.

The return trip was made early in the afternoon, the cars checking in at the North American building between 3 and 4 o'clock. There were originally forty-one entries in the run, but two cars failed to start. One of those had been shipped by freight and was lost in the maze of twenty-seven freight depots of which Philadelphia can boast.

Of the thirty-nine that participated, all but three completed the full course. The roads selected embraced every variety of good roads possessed by Philadelphia as well as short stretches of highway that could not be so designated. There were five considerable hills on the way, one of which was about 10 per cent gradient and another a very long 4 per cent rise. In Fairmount park the little hills are numerous, but no account is taken of them because the surface of the roadways was so perfect. All the way on the out-trip, the contestants faced a stiff northwesterly wind which

NO. 111, HALLADAY, AUMENT DRIVER, CLEAN ROAD SCORE

Their Roadability

proved so strong that in places it was difficult to coast down a gentle grade without using some degree of power.

The prize-winning and losing had nothing whatever to do with the performance of the cars. It was sheer guess and the plan by which the winners were determined was as follows: When each car checked out, the entrant handed to Mr. Huyette a sealed envelope containing the number of hours, minutes and seconds in which he or she estimated that the trip ought to be made. These times were added together and averaged and the result was 4:12:24⅔ elapsed time. Of course, in order to participate in the prizes, the contestants were obliged to complete the run within the rules. These were simple and informal and did not require difficult things of the cars.

Mrs. B. L. Townsend, entrant of a Baker car, made the distance in 4:14:20 and won a gold mesh purse of handsome design. Mrs. E. V. Stratton in a Waverley was next nearest to the secret time and was awarded a silver mesh purse. Her elapsed time was 4:16:45. The men's prizes were won by Dr. C. W. Houghton, who drove a Studebaker in 4:14:45, and by the Waverley Electric Co. in 4:20:28. Dr. Houghton was given a cup and a smaller one was given to the company.

The flotilla of Woods cars, numbering a dozen, did not capture a prize, but they all covered the full course and finished all around the winners. The Detroits also failed to get a prize, although nine of them competed. There is no reflection upon either of these cars because of the failure to win.

The fastest time was by a Detroit car, which covered the course, making an average of 16.6 miles an hour. Two of the Detroit cars were among the missing at the finish of the run and the Clark entry furnshed the other unfortunate.

In the matter of batteries the cars were generally equipped with lead-acid cells, but there were a few Edisons in the column. The test to which they were subjected was not of sufficient length to develop marked superiority over one another. No official observers accompanied the cars.

HALBERT IN GROUT, WHICH HAD PERFECT ROAD SCORE

TAGS AND LIGHTS FOR ALL

Washington, D. C., Nov. 15—Special telegram—Washington motorists gained a great victory today when lights and tags on horse-drawn vehicles in the District of Columbia were demanded by an amendment to the police regulations adopted by the commissioners. The regulation regarding lights will go into effect December 15. The tag ordinance will become effective April 1. The regulations have been under consideration several months and are adopted by the commissioners under the authority to "make all such reasonable and usual police regulations as may be deemed necessary for the protection of the lives, limbs, health, comfort and quiet of all persons, and the protection of all property within the District of Columbia." The regulation in regard to lights provides that every private vehicle, between ½ hour after sunset and 1 o'clock a. m. shall display lamps or lanterns showing a white light visible for a distance of 200 feet front and rear. It is provided, however, that this regulation shall not apply to private vehicles when belated not more than 1½ hours after sunset en route to their stables and if driven not faster than a walk. Public vehicles for the conveyance of passengers for hire must display lamps visible for a distance of 200 feet front and rear, between the ½ hour after sunset and ½ hour before sunrise. It is further provided that every horse-drawn vehicle when used for business purposes shall have affixed to the right side so as to be plainly visible for a distance of at least 20 feet a metal tag with numbers thereon at least 3 inches in height.

NO. 117, HAYNES, WHICH FINISHED WITH PERFECT ROAD SCORE

MAXWELL WINS HOUR RACE

New York, Nov. 14—Despite two postponements, cold weather and a 40-mile gale of a peculiarly penetrating character, the fall race meeting of the Mount Vernon Automobile Club at Empire City track, near Yonkers, proved a success.

Summaries of the meet:

ONE-HOUR RACE: SPLITDORF MAGNETO TROPHY

Car	Driver	Distance
Maxwell	C. W. Lowa	44½
Black Crow	O. F. Rost	44¼
Buick	E. L. Haas	43

TEN MILES, FOR CARS OVER 300 CUBIC INCHES

		Time
Mercedes	S. E. Wishart	10:52
Stearns	M. McBride	11:35
Mercedes	H. Mendel	11:45

TEN MILES, FOR CARS UNDER 230 INCHES

Reo	P. Haycock	13:52
Buick	P. von Bartmer	13:53
Maxwell	C. W. Lowa	14:46

FIVE MILES, FREE-FOR-ALL HANDICAP

Mercedes	S. E. Wishart	5:23
Stearns	E. L. Haas	5:46
Mercedes	H. Mendel	5:52

TEN MILES, CLUB MEMBERS, HANDICAP

Stearns	E. L. Haas	10:55
Mercedes	H. Mendel	10:56
Black Crow	O. F. Rost	11:06

CONTINENTAL EYES TURN TO OLYMPIA SHOW

J. SIDNEY CRITCHLEY

British Engineers Devoting Special Attention to the Camshafts—Long-Stroke Motor Gains in Favor—Many Adopted in Small Motors—Use of Front Wheel Brakes Three-Speed-Set—Lubrication of Motor Has Been Made Finding New Friends—Detachable Wheel Now Stock

LONDON, Nov. 4—The Olympia motor car show opened its doors today and will remain open until a week from tomorrow. Last year the Olympia show, which, by the way, is run entirely by the trade through the organization of the Society of Motor Manufacturers and Traders, held the premier position in regard to European displays, as the usual annual show held in Paris did not take place. Trade depression was given as the reason for the temporary shutting down of what had been considered a permanent item of the year's events. England made the best of the opportunity and last year's show demonstrated to the world that the motor car industry, so far as the continent of Europe is concerned, is centered in London. It remains to be seen to what degree the coming show will be affected by the resumption of the Paris show in December next.

The London show differs from the Paris one in this respect: In London every leading motor car of Europe is exhibited, whereas in Paris the exhibits are largely confined to French productions. Buyers discovered this upon the cessation of the Paris show, and it would appear as if the center of gravity will remain here in London.

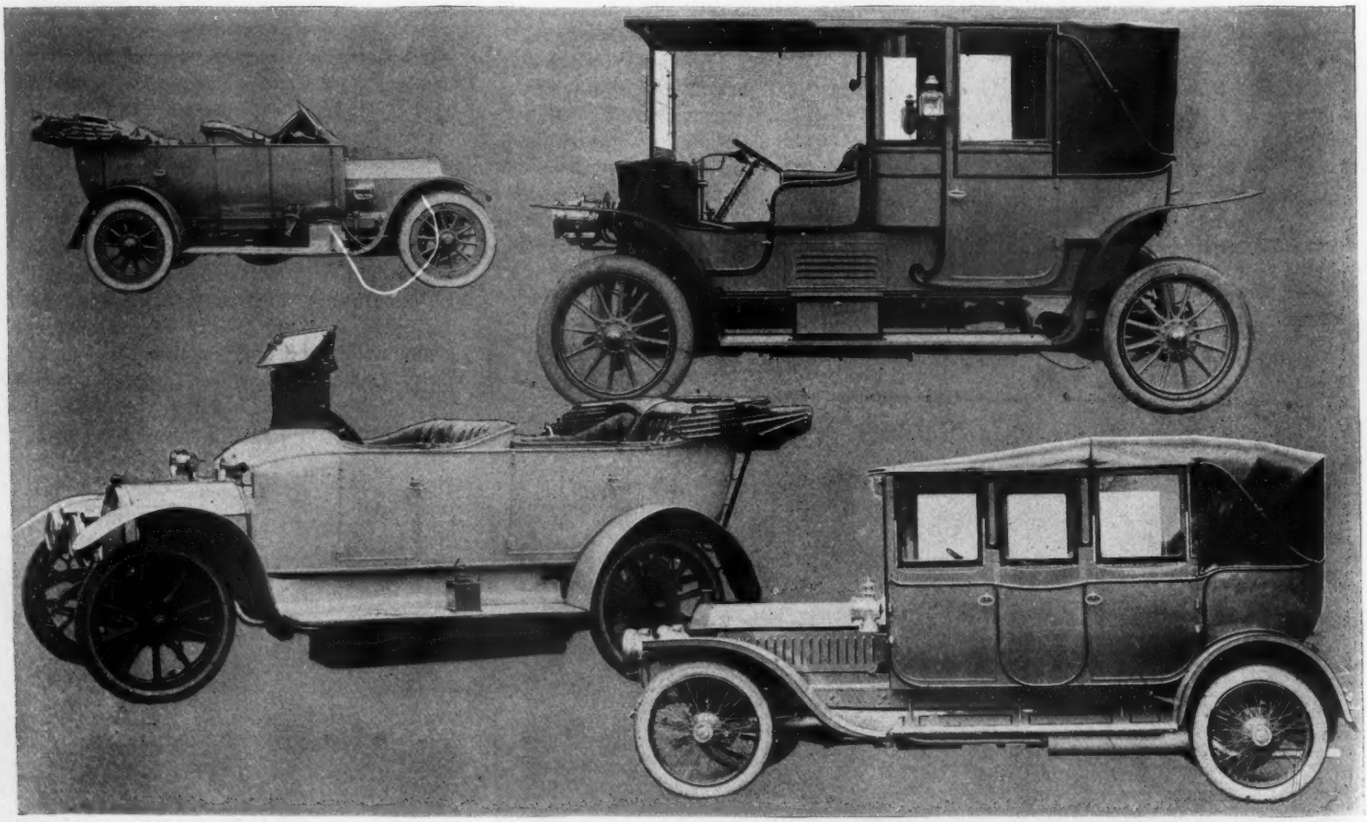
The number of firms exhibiting is 138. The regulations regarding duplication of models are somewhat stringent, it therefore follows that practically every known make of car manufactured in Europe is exhibited. In addition to the car exhibits there are at least 250 exhibitors of accessories. Numbers of would-be exhibitors are shut out; in fact, there is not sufficient space to adequately accommodate the members of the trade association.

The show of 1910 promises to be fully as interesting and to mark the stride of progress in as full a degree, if not greater, than any previous one. There is, however, no indication of any radical new form of construction, as was instanced by the Knight engine 2 years ago, which in spite of false prophets has firmly established itself, so much so that in addition to the Daimler and Minerva firms, which made this motor a commercial proposition, both Panhard and Mercedes are exhibiting models of chassis fitted therewith. In addition, the Rover company of England has adopted the motor for two new models. At the moment there does not appear to be a real live companion to the Knight. Numbers of experimental motors have been made, but as yet a second slide valve engine has not put in an appearance, the nearest approach being the Hewitt piston valve engine. However, the day is not far distant before some reputable firm will take the plunge and fill the gap.

The introduction of the Knight motor has had a very stimulating effect on the motor industry of Europe, and it was just one of those shake-ups that came not a moment too soon. It has been the means of developments in the design and construction of poppet valve engines, which have made that type of engine a horse of a different color.

Noises Are Reduced

Every part of the poppet valve motor which was before time inclined to be noisy has been remodeled. For example, chains and worm gears are now in some instances being employed for driving cam shafts; the valve spindles and push rods are being encased, and cams are now actuating the rollers through the intermediary of a pivoted lever. In one or two instances cars will be exhibited with silencers, fitted to the induction. Everything possible is being done to make the poppet valve engine more silent and more efficient. There is a decided increase in valve areas, enabling higher speeds to be attained.



15-20-HORSEPOWER B. S. A. TORPEDO BODY
TORPEDO BODY ON 12-14-HORSEPOWER FIAT

ENCLOSED BODY ON 30-HORSEPOWER NEW ENGINE CHASSIS
NAPIER 45 WITH CABRIOLET SALOON BODY OF GREAT LUXURY

ENGLAND'S MOTOR EXHIBITION GREAT DISPLAY

Reduction of Noise in Motors—Chain Used to Drive Are Using Worm Drive for Next Season—Ball Bearings Gaining in Favor—The Four-Speed Gearbox Replaces Special Object of Study—Multiple-Jet Carbureters with Many Manufacturers—The Magneto Is Universal

The most striking feature of the show from the students' point of view will be the increase in the ratio of bore to stroke. The writer believes that in the United States the average ratio is 1 to .95. In some instances motors are exhibited having a ratio of 2 to 1. A notable instance is the French Gregoire car, with a bore of 80 millimeters and stroke 160 millimeters. Other examples may be mentioned:

	MM	MM	Inches	Inches
Mercedes	70	by 120	or 2.75	by 4.72
Mercedes	80	by 130	or 3.14	by 5.11
Mercedes	90	by 140	or 3.54	by 5.51
Mercedes	100	by 130	or 3.93	by 5.11
Wolseley	90	by 130	or 3.54	by 5.11
Peugeot	70	by 130	or 2.75	by 5.11
Panhard	90	by 130	or 3.54	by 5.11
Panhard	100	by 140	or 3.93	by 5.51
Napier	82	by 127	or 3.22	by 5.00
Mors	75	by 120	or 2.95	by 4.72
Metallurgique	90	by 140	or 3.54	by 5.51
Metallurgique	101	by 150	or 3.97	by 5.90
Le Gui	75	by 150	or 2.95	by 5.90
La Buire	75	by 130	or 2.95	by 5.11
Germain	106	by 180	or 4.17	by 7.08
Germain	80	by 130	or 3.14	by 5.11
Fiat	80	by 130	or 3.14	by 5.11
De Dion	90	by 150	or 3.54	by 5.90
De Dion	75	by 130	or 2.95	by 5.11
Deasy	80	by 130	or 3.15	by 5.11
Darracq	75	by 120	or 2.95	by 4.72
Darracq	80	by 120	or 3.14	by 4.72
Darracq	100	by 140	or 3.93	by 5.51
Daimler	69	by 114	or 2.71	by 4.48
Daimler	80	by 130	or 3.14	by 5.11
Daimler	101	by 130	or 3.97	by 5.11
Calthorpe	75	by 150	or 2.95	by 5.90
Calthorpe	90	by 150	or 3.54	by 5.90
Brasier	70	by 120	or 2.75	by 4.72
Brazier	80	by 130	or 3.14	by 5.11
Brasier	90	by 140	or 3.54	by 5.51
Argyll	72	by 120	or 2.83	by 4.72
Argyll	90	by 140	or 3.54	by 5.51

This list is sufficiently comprehensive to indicate the tendency to long-stroke motors. That long-stroke motors can be built to turn fast is clearly demonstrated by the results of the Coupe des Voiturettes. It is calculated that many of the motors in this event had a piston speed of 3,000 feet per minute.

Taking a more normal instance, we have the remarkable record at Brooklands track, with a Vauxhall motor, 90 by 120, running at a maximum speed of 97½ miles per hour for the flying ½ mile. This engine develops 38 horsepower at 2,300 revolutions per minute.

Worm Drive Gaining

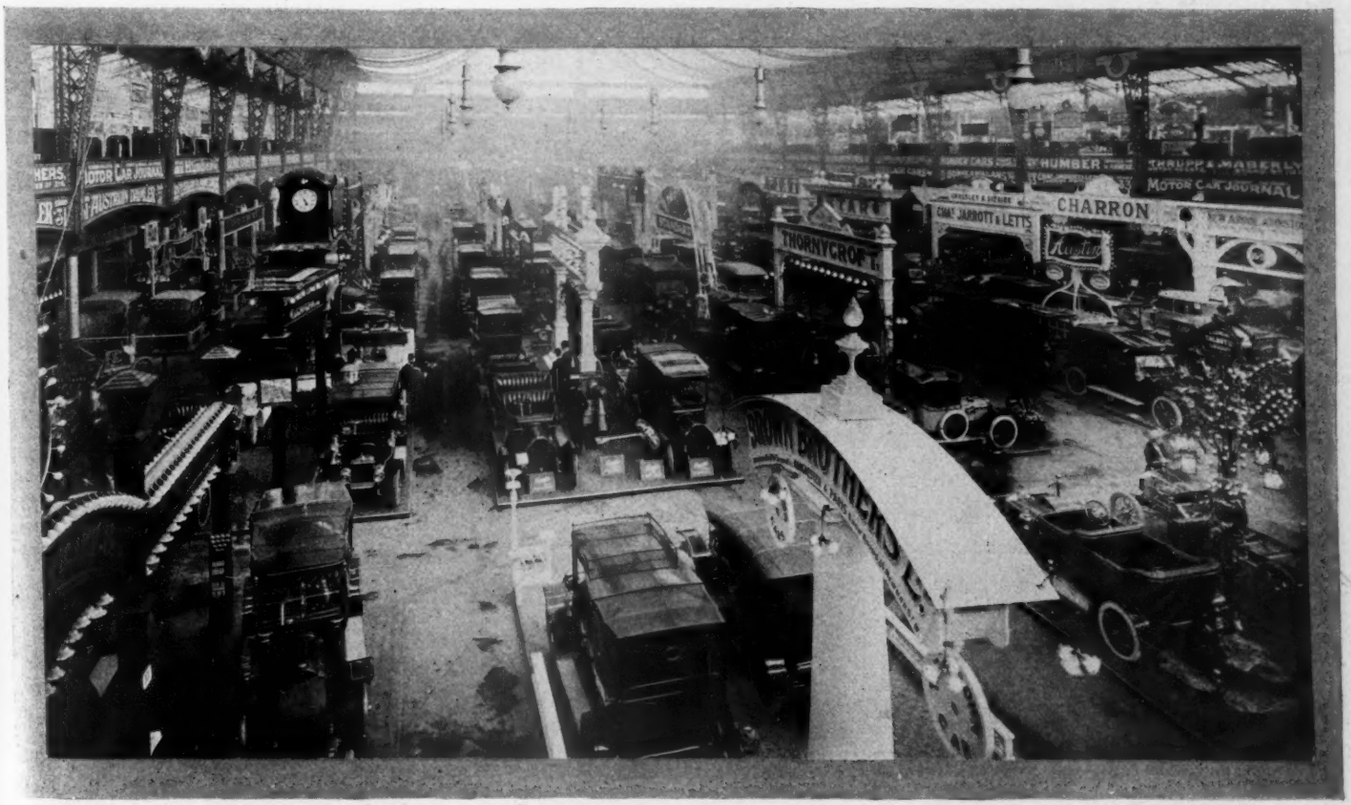
A number of cars are found to be fitted with worm drive and this type of final drive is becoming more general. It is adopted among others by Daimler, Deasy, Wolseley and Argyll in different models, as well as by the original pioneers, namely, Lanchester and Dennis.

Worm drive has gone through its period of probation and is now accepted by the man in the street as a suitable drive, hence we may expect to see a further increase in its use. Engineers may know that a worm drive is a sound construction, but it is not always found that the public takes the same view. However, since the worm drive has been adopted by several well-known firms, it is regarded by the public in quite a different light and really now the only point for discussion among the quidnuncs is the position of the worm, whether it should be placed at the top or under the worm wheel. The majority of cars worm driven will be found with the worm in the lower position and the axes of the engine and gearbox inclined. The only advantage that can be claimed for the upper position is that it gives more clearance, and on the other hand, lubrication is more uncertain.

Ball Bearings in Motors

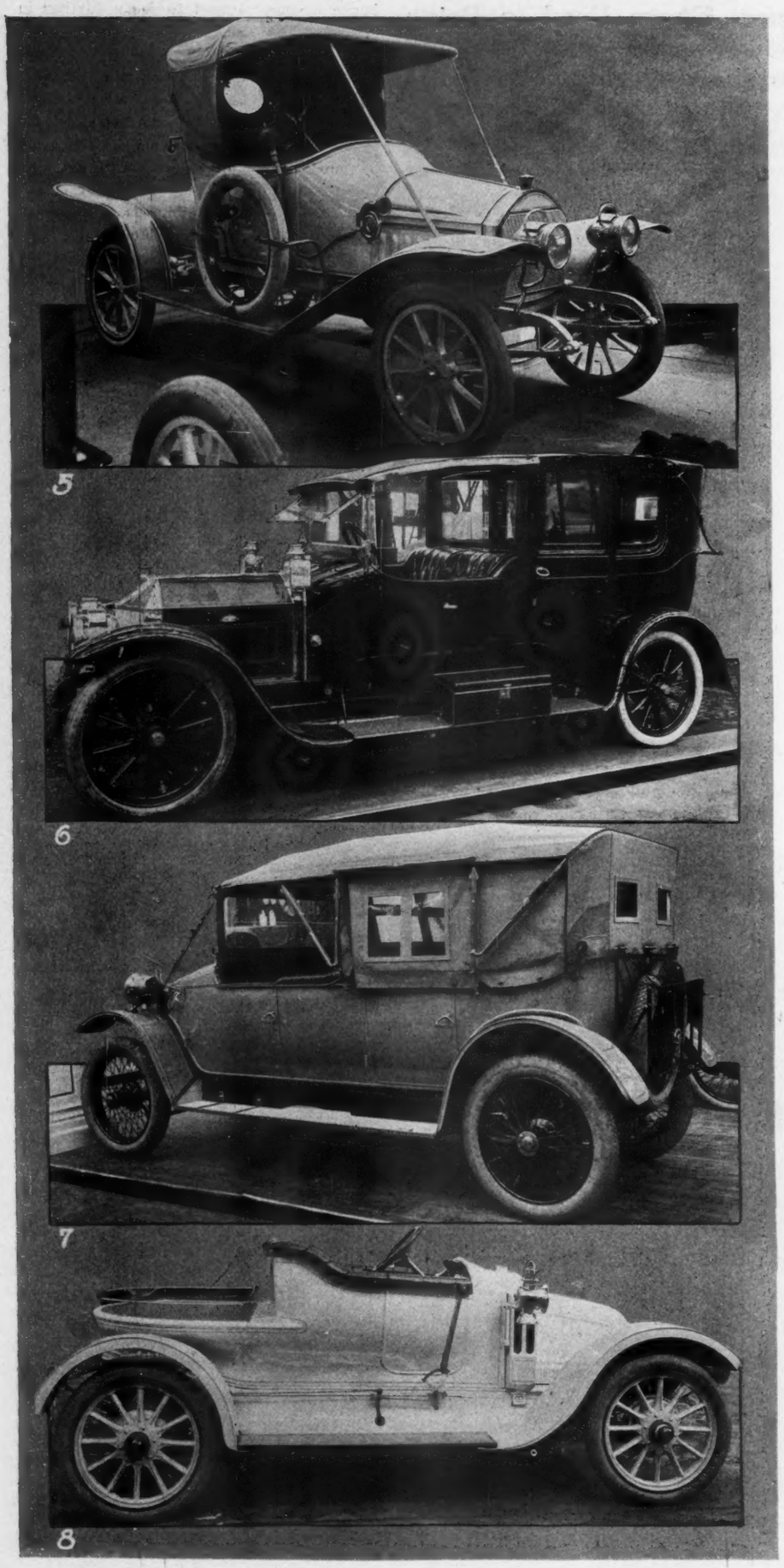
In small motors ball bearings are in evidence. The new model Daimler 69 bore by 114 stroke—2.71 by 4.48 inches—is a typical example. Monobloc cylinder castings will be largely represented, the system being adopted in one instance in the case of a new Fiat six-cylinder engine. The medium powered six-cylinder car is developing to an appreciable extent and this class is not by any means confined to the higher powers as heretofore.

The employment of two bearings only for a four-cylinder motor does not appeal to the British buyer, but a notable example of an engine so fitted will be found on the chassis of the new Argyll model 72



INTERIOR VIEW OF OLYMPIA IN WHICH EXHIBITED 138 FIRMS BUILDING MOTOR CARS AND OVER 250 CONCERNS ENGAGED IN THE ACCESSORY MANUFACTURING BUSINESS

1911 Body Styles in Runabouts



5

6

7

8

millimeters bore by 120 millimeters—2.83 by 4.72 inches—stroke. This mark, by the way, is fitted with an overhead worm drive to the back axle.

The three-bearing crankshaft is more general for four-cylinder engines up to 90 millimeters—3.54 inches—bore and five bearings for cars over. The new models are almost confined to cars of about 80 millimeters—3.14 inches—bore. This size is becoming extremely popular and with a long stroke gives excellent results. Moreover, its horsepower works out at just under 16 R. A. C. rating, and so is included in the class only liable for a tax of $20.34. The rate of taxation calculated by the R. A. C. formula will undoubtedly influence design and tend to further develop the long-stroke motor. The only new model in the larger four-cylinder cars is a 5-inch bore by 5½-inch stroke, introduced by the Wolseley company.

Four-Speed Gearboxes

Four-speed gearboxes, both for high and low powers, are taking the place of the three-speed boxes. This is quite in accordance with the duties most cars are called upon to perform. The Daimler company, however, still adheres to three speeds only and supports its practice by asserting that the flexibility of the Knight motor is such that four speeds are unnecessary. It has long been proved, however, that in every case four speeds are better than three.

Introduce Front Wheel Brakes

Front wheel brakes are becoming quite a feature and radical improvements will be found in connection with this fitting. The inherent difficulty with front wheel brakes is, of course, the rise and fall of the front axle in respect to the frame, which gives rise to a variable effective length between the brakes and the part of the frame from which they may be operated. Another feature in connection with front brakes is that it is absolutely essential that the road wheels be set so that the axles of the wheel and the steering pivot are so arranged that if the centers are produced towards the road surface they meet exactly at the center of the wheel where it is in contact with the ground. This point is now fully recognized by the firms which have adopted its use, such as Argyll, Sheffield-Simplex, Crossley and others.

Two Lubrication Systems

Lubrication can be divided into two classes—splash and pressure—that is, with oil pressure on the bearings. In some instances there is a combination of pressure and splash, the main bearings being supplied by pressure and the big ends by splash.

It has been demonstrated that ordinary gasoline engines can be lubricated quite

5—Onyx 12-Horsepower Torpedo Runabout
6—Napier 24-Horsepower Double Landaulet
7—Lancaster 38-Horsepower Touring Car
8—Arrol-Johnston 15-Horsepower Runabout

as efficiently without pressure as with it and therefore the only advantage in forced pressure lubrication would appear to be that it enables one to cut down the bearing surfaces to a smaller area. On the other hand, there are certain disadvantages which it is not necessary to discuss at the moment. The system of lubrication, which, with various modifications in detail, is most general, consists in the arrangement characterized by the use of a pump circulating the oil from a sump to the main bearings through ducts and into troughs for the lubrication of the big ends of the connecting rods, the latter being provided with dippers, effecting not only the lubrication of the big ends, but also the pistons, cams and other moving parts.

The Daimler company has introduced a novel form of trough, which is capable of being raised or lowered. A separate trough is employed for each connecting rod, into which the oil is fed by a circulating pump. With the small motors a single pump is employed, but with the larger sizes a separate pump is fitted for each trough, the series operating in unison. The raising and lowering of the troughs is effected by a simple mechanism in synchronization with the working of the throttle. Thus as the speed of the motor is increased the troughs are raised and vice versa. The main bearings are lubricated by the drip of the oil into pockets situated above the main crank bearings. Instances will be seen of pressure system to all bearings and some makers have gone so far as to drill the connecting rod into the gudgeon or piston pin, which appears to be quite unnecessary.

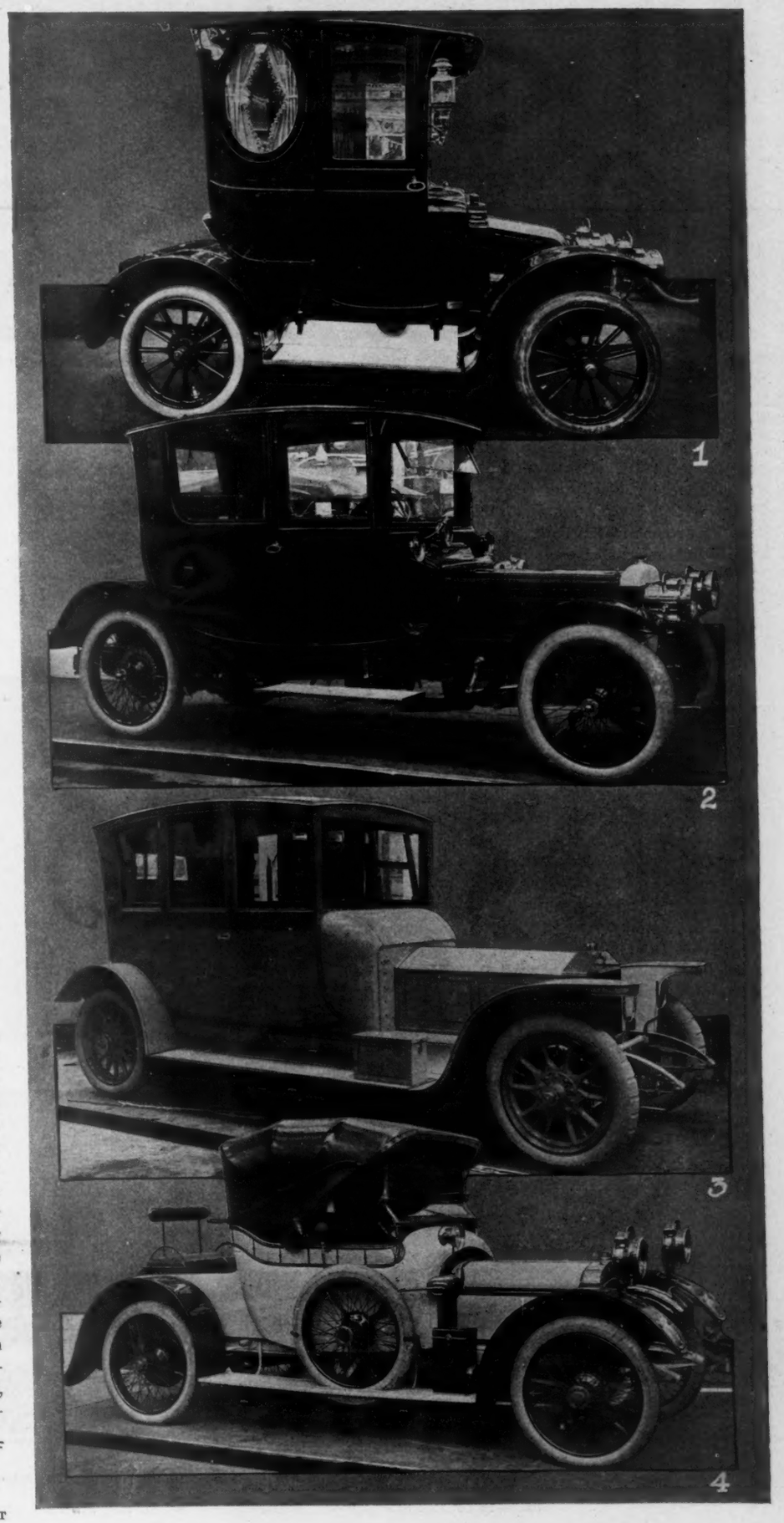
Excellent results are obtained by the simple trough splash system, but adequate means must be adopted to accurately gauge the supply of oil within the base chamber. In some instances the means adopted leave much to be desired, neither are the filtering arrangements in all cases at all satisfactory.

Multiple-Jet Carbureters

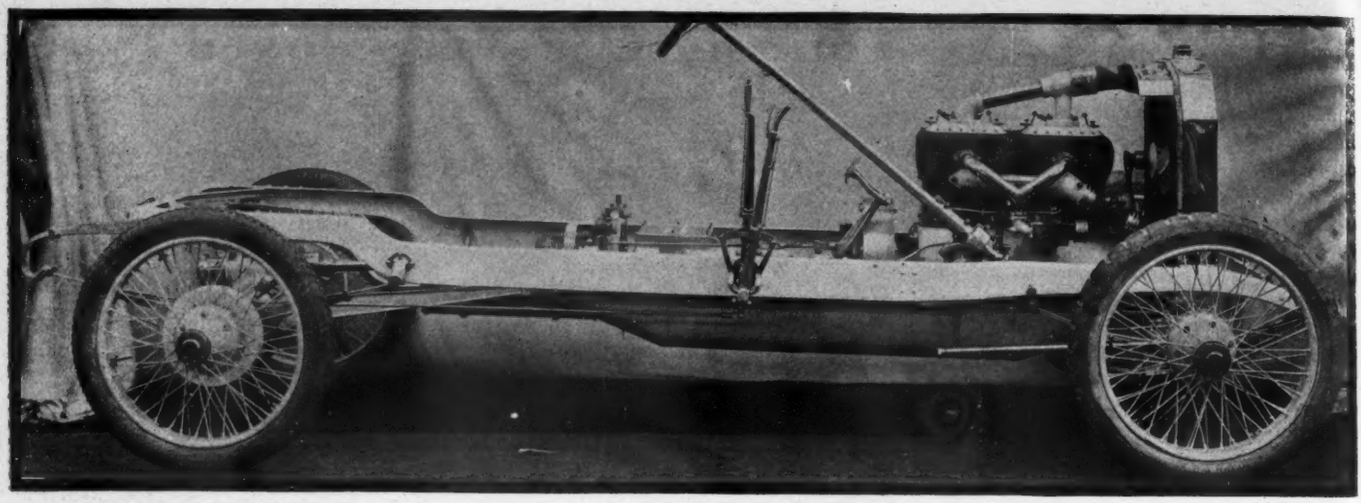
The multiple-jet carbureter will be found to have received quite a lot of consideration during the past year. Napier, Daimler, Wolseley, Rolls-Royce and many others employ such constructions. The Napier carbureter has an annular float chamber, two jets and an adjustable choke tube in connection with the primary or auxiliary jet. This carbureter has neither valves nor springs, the sole control being effected by the throttle and the adjustable choke tube.

The combination of the auxiliary automatic air valve with the jet to give more gasoline supply is noticed in connection with the Crossley carbureter, but the system does not appear to make headway, the preference being given to the multipli-

Touring Cars and Closed Types



1—Renault 8-Horsepower Cabriolet
2—Daimler 58-Horsepower Coupe
3—Rolls-Royce Six-Cylinder Pullman
4—Thorneycroft 18-20-Horsepower Runabout



24-Horsepower New Pattern Dennis Chassis with Worm Drive and Thermo-Syphon Cooling

cation of jets. The heating of induction pipes or intake manifold by water or exhaust instead of the carbureter is a somewhat new development in one instance the inside of the induction pipe is fitted with four copper tubes inserted to convey the hot water across the path of the mixture on its way to the cylinders. With monobloc cylinders the intake manifold is usually found within the casting, which obviates any necessity for heating the carbureter.

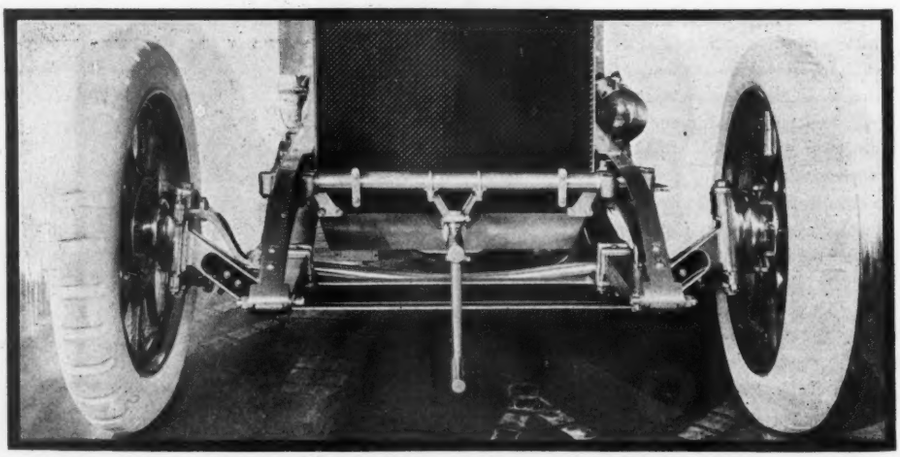
Generally it will be found that the float chambers are not concentric with the jet, but many carbureters are to be made on those lines, as it is a system which more generally adapts itself to the modern requirements of compactness and simplicity. Spring-controlled auxiliary air valves are quite the general rule, in some instances dash pots being also combined therewith.

Thermo-Syphon Cooling Gains

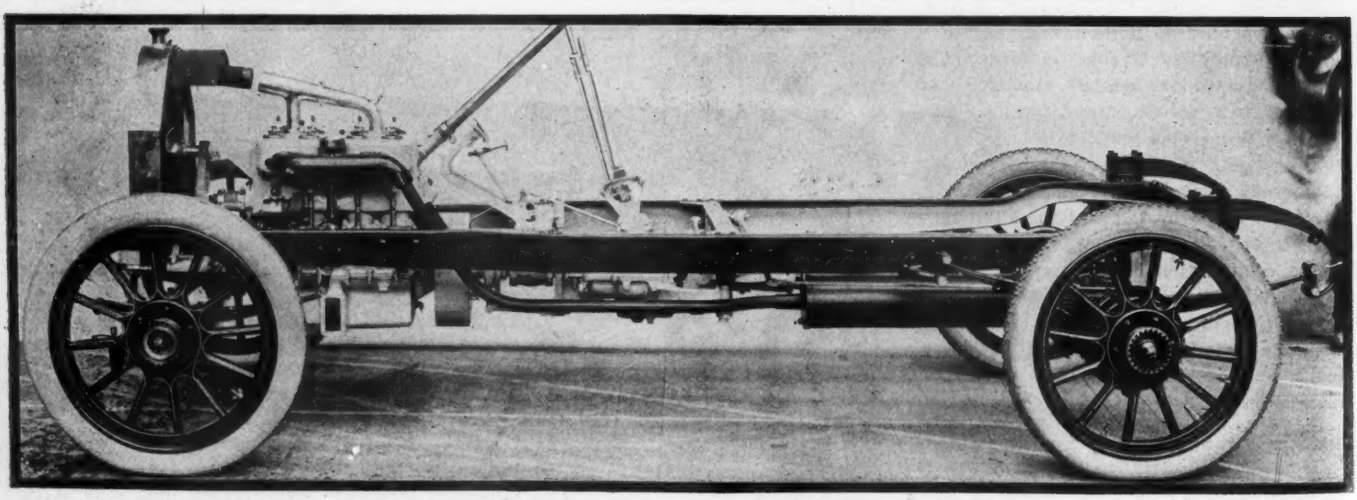
Thermo-syphon cooling is rapidly assuming its proper position in percentage of cars fitted and the system generally is being dealt with more effectively, and the difficulties in connection with the system more satisfactorily dealt with. The Renault cooling construction is being adopted by several firms, but the front radiator is still the fashionable position. The cylinder castings for thermo-syphon cooling have been most carefully studied to obtain satisfactory cooling around the valves and a very large body of water is provided for by cylinder covers of comparatively large dimensions.

The Magneto Is Universal

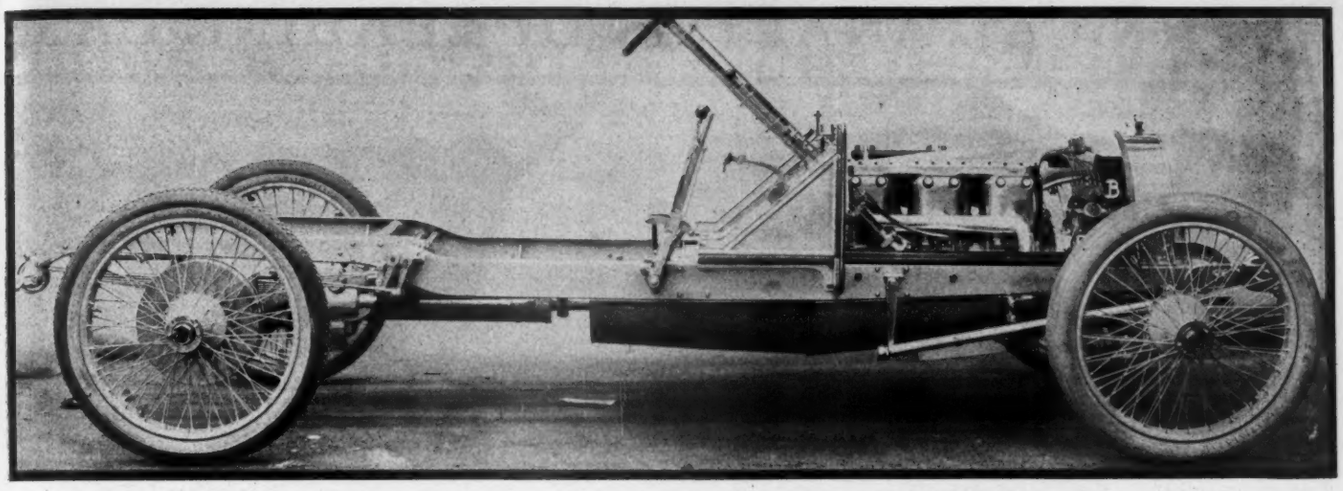
Magneto ignition is universally fitted and in the majority of cars it is solely relied upon. When two systems are provided it generally is the dual one, and in only a few instances do we find the magneto and battery arranged independently. The two-plug construction with a two-point interrupter magneto which enables a pair of plugs to be fired simultaneously is sure to find some supporters. The claim made for the system is that by its adoption a fixed firing point will give greater efficiency than can be obtained with the older system and variable control. The matter of fixed and variable firing point is one which is not yet conclusively settled one way or the other. There is much to be



Front Axle Design on Rolls-Royce Six-Cylinder Car



Chassis of 12-20-Horsepower Humber Showing Water Tank and Oil Glass on Motor



SIX-CYLINDER 25-HORSEPOWER SHEFFIELD-SIMPLEX CHASSIS, INCORPORATING MANY NEW IDEAS

said in favor of both systems and the benefits to be derived from the variable arrangement are dependent upon the human element. For certain classes of vehicles, taxicabs, for instance, the fixed firing point is the only possible one.

The fitting of two magnetos does not appear to be receiving any serious attention at the present time. Attention is, however, being given to the fitting of dynamos for electric lighting and battery charging, and at least one firm will have a design of engine arranged for such an equipment, driven by spur gearing and forming a prearranged unit conveniently situated.

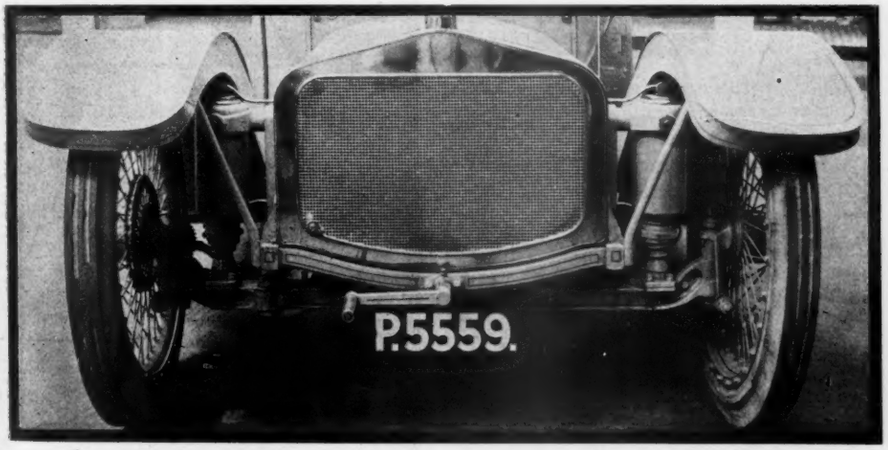
Detachable Wheel Rules

All the leading manufacturers in England either are fitting detachable wheels as a standard or are in a position to supply them at an extra cost. The Rudge-Whitworth type is perhaps most employed, but the Sankey pressed steel wheel and other makes are being manufactured to a considerable extent. It is only a question of time and we shall see this class of wheel a standard construction.

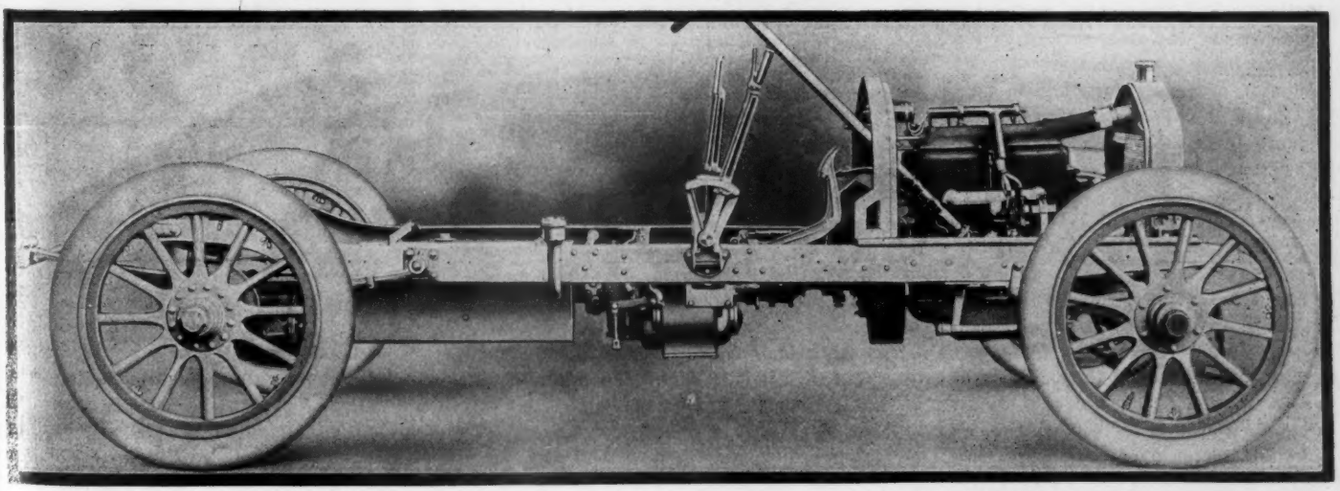
The sub or under frame never has appeared necessary to the writer and the majority of the new models are constructed without it. The frames are for the most part stepped in at the front and raised at the back axle.

The show reveals a remarkable increase in the flush-sided body, both for open and closed cars. To such an extent has this type caught on that several makers, including Humbers, are now constructing chassis with the change speed lever fitted to the inside of the frame in order to facilitate the body construction. Doors to front seats will be to a large extent found in connection with limousine and landaulet bodies. The two-seated cabriolet body is distinctly on the increase, and the ordinary open type is losing out.

Generally speaking, there is an indication of an increase in prices rather than any reduction. More than one firm already has given notice of increases. There does not appear to be any indication on the part of the British manufacturer to make cars at price, but rather to make the cars as well as they know how or are able to and then to figure out the price question.



COWLEY SUSPENSION SPRING ON 1911 CHASSIS



THE 16-20-HORSEPOWER WOLSELEY CHASSIS WITH SPECIALLY LARGE RETURN WATER PIPES

TECHNICAL ANALYSIS OF LEADING CARS

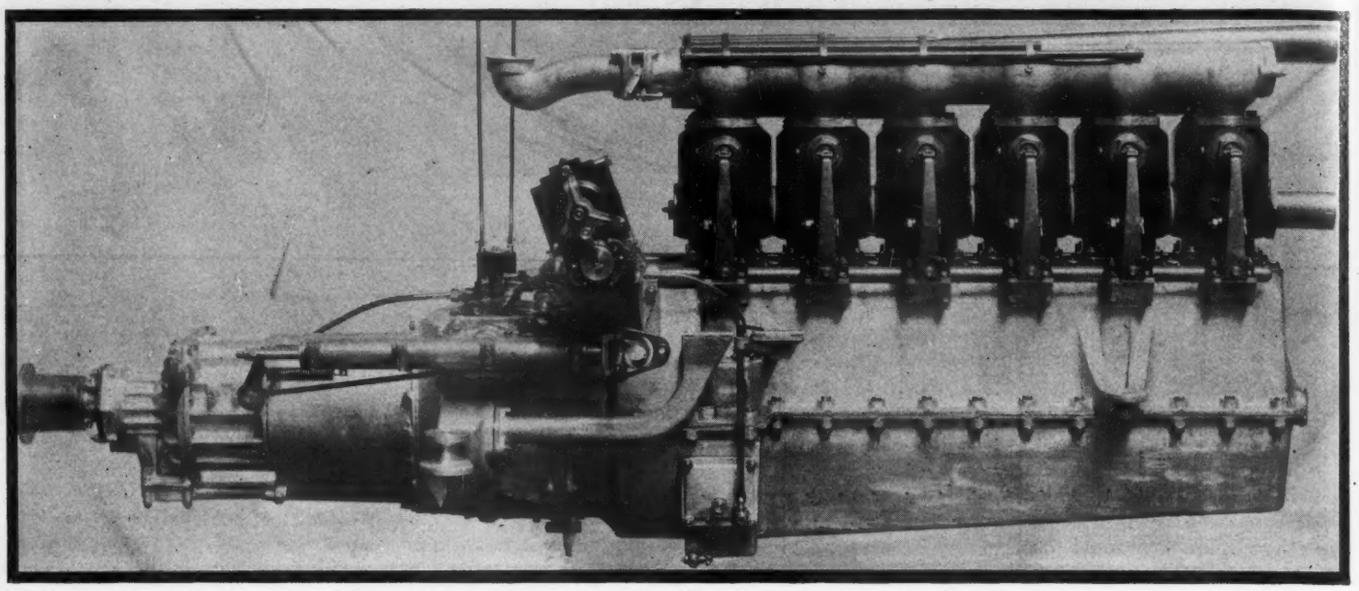


FIG. 1—THE NOVEL SIX-CYLINDER LANCHESTER MOTOR WITH ITS CYLINDERS CAST SEPARATELY AND THE VALVES MOUNTED HORIZONTALLY IN THE CYLINDER HEAD AND OPERATED BY LONG VERTICAL ROCKER ARMS FROM THE EXTERNAL CAMSHAFTS. THE GEARBOX IS A UNIT WITH THE MOTOR AND THE MAGNETO IS MOUNTED IN REAR OF THE FOURTH CYLINDER

By J. S. Critchley

LONDON, Nov. 4—The ninth international motor exhibition at Olympia, which opened today, may truly be termed "international." All the leading European cars are collected within the four walls of Olympia. There are approximately 300 stands, including 111 for cars, twenty-seven carriage building firms, thirty-two for tires and wheels, 116 for components and accessories, the balance being made of sundry exhibits.

Every manufacturer can look backwards on the past year with pleasure. Never has the year's trade turned out more satisfactorily than during the said period and if Olympia fulfills its expectations, of which there is every indication, the British manufacturers, and for that matter, many of the foreign exhibitors, will have no cause for complaint. The exhibition demonstrates in a marked degree the enterprise and conscientious endeavors which have been made by British manufacturers to overtake the competitors from the continent. The British car of today is without doubt equal, if not superior, to any of the continental makes; as a matter of fact, it is not now necessary for English engineers to think at all about what the foreign manufacturer is producing. At one time the French manufacturers held the lead, but an examination of the cars at the present exhibition will even convince foreign manufacturers that the English engineer has at last in the long run demonstrated the national trend of his mechanical skill in this new branch of engineering.

The total value of the exhibits is estimated at $4,250,000, the cars ranging in price from $750 to $10,000. There is a considerable increase of cars at prices up to $2,500 in value; 22 per cent of the cars are listed at $1,000 to $1,500; 23 per cent at $1,500 to $2,000, and 24 per cent at $2,000 to $2,500. It will therefore be seen that considerably over 50 per cent of the cars are priced at under $2,500. The percentage of cars under $1,000 is only 3.7 per cent.

Some of the more prominent exhibits can be described as follows:

Argyll Chassis Improved

The outstanding feature of the new Argyll cars is the new 12-horsepower model. This model is distinguished from any previous Argyll car by reason that it is fitted with a worm-driven back axle and is also fitted with front wheel brakes. The worm-drive adopted is of the overhead arrangement, which has been successfully used by the Dennis firm for many years. One feature of the arrangement is novel, inasmuch as the propellor shaft is enclosed in a tubular casing that is attached to the frame at the top end by means of a spherical trunnion. This system is being adopted by a number of makers, although there is nothing novel in connection with its application to bevel drives.

The Argyll engine is slightly tilted forwards, with the idea that when the load is put on the chassis the engine and worm will be in direct alignment. This tilt appears in the chassis illustration, Fig. 4, page 29. The size of the engine is 72 bore by 120 stroke—2.83 by 4.72 inches—with the cylinders cast mono-bloc. The crankshaft is supported by two bearings only, which is somewhat rare in connection with British cars. The engine is quite a clean design, Fig. 4, with the valve springs, etc., encased by plates. The magneto is placed transversely at the front driven by skew gearing, a position of which a good deal can be said in favor and

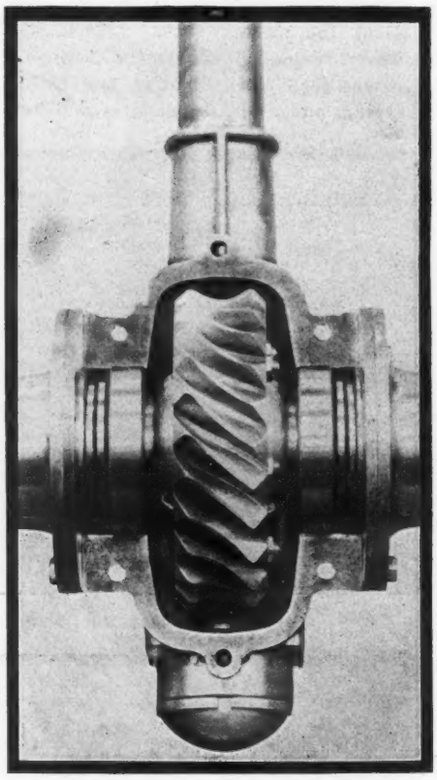


FIG. 2—IN THE 1911 ARGYLL CARS WORM DRIVE AT THE REAR AXLE IS USED. THE EXPOSED WORM WHEEL IS SHOWN IN THIS ILLUSTRATION AND IN FIG. 3 ON THE FOLLOWING PAGE IS SHOWN THE EXPOSED WORM WHICH MESHES WITH THE WHEEL

one which is being adopted to a considerable extent. No arrangements are made for timing the ignition, and one would imagine that for a car of these dimensions hand timing would be an advantage. It is well to note that a four-speeded gearbox is fitted. The clutch is of the multiple-disk type. Front wheel brakes are fitted and absolute center point steering has been adopted. As previously pointed out, this

SHOWN AT OLYMPIA'S ANNUAL EXPOSITION

is a necessity with brakes of the type named. The trough system of lubrication has been adopted, the oil pump at the same time forcing oil to the crankshaft bearings, while the distribution gear is lubricated by means of a jet of oil impinging thereon. Te Zenith type of carbureter has been installed, and needless to say, thermo-syphon cooling is used.

Several Napier Types

The exhibit of the Napier includes 45-horsepower, six-cylinder car; 30-horsepower, six-cylinder torpedo touring car; 15-horsepower, four-cylinder landaulet; 15-horsepower chassis. The interesting exhibit is the 45-horsepower cabriolet saloon, page 22. As its name implies, it can be used either as an open or a completely closed car, and as the closed portion extends to the dashboard, the same protection is given to the occupants of the driving seat as to those in the rear part. The interior is divided by a movable window, so that two distinct compartments can be formed at will. The car will carry six in all—that is, two on the main interior seat, two on movable seats—these four seats being in the rear part—and two on the driving seat.

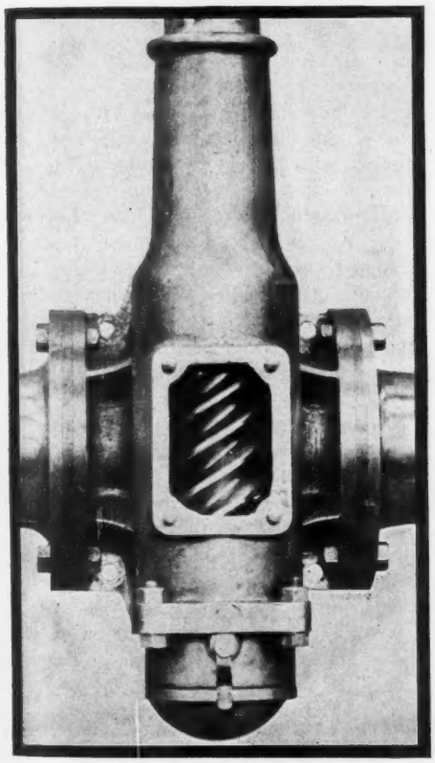


FIG. 3—THE WORM USED ON THE ARGYLL REAR AXLE FOR 1911. THIS AXLE IS MADE WITH THE WORM OVERHEAD OR ABOVE THE WORM WHEEL, WHEREAS IT IS CUSTOMARY TO PLACE THE WORM UNDERNEATH THE WORM WHEEL

The 15-horsepower chassis was introduced by the Napier firm last season and has proved a very satisfactory vehicle, some hundreds of this model now being seen in London as taxicabs. The bore is 82 millimeters and the stroke 127 millimeters, the cylinders being cast in pairs and all valves placed on one side. An unusual feature in connection with the chassis is that the flywheel is placed at the front end of the engine. The magneto shaft is set across the front of the engine and driven by skew gearing. The crankcase is fitted with a sump, from which oil is drawn by a pump driven from the camshaft, which supplies oil to the main bearings and sprays oil upon the distribution gear. The spring shackles, brake and cam spindles are all fitted with Stauffer lubricators, as is usual with all British cars almost without exception. The carbureter is on the Zenith lines and of the two-jet type. Thermo-syphon cooling is adopted.

The engine clutch and gearbox are united on the motor system and the unit is supported from the longitudinal and cross members. The gearbox has four speeds, with a ratio of 4 to 1 on the top speed for open cars. Worm drive is employed, the worm being under the back axle casing. The springs are fixed at their front ends. Magneto without battery is used.

Improved Wolseley Models

That representative British firm, the Wolseley Tool and Motor Co., Limited, the proprietors of which are Vicars Sons & Maxim, Ltd., has a specially interesting exhibit. The 16-20 horsepower chassis is a very well-proportioned machine. The cylinders are cast in pairs, Fig. 9, with ample water space, a good depth of water being provided by the large openings at the top of the cylinders, 3⅜ by 1⅝ inches. The valve guides are cooled, a point sometimes overlooked. The compression space allowed is 24.6 per cent of the total volume swept out by the piston, the space being regulated by the shape of the undersides of the valve caps. The valves have an area of opening equivalent to 7.8 per cent of the piston area for the inlet valves and 11.7 per cent for the exhaust. The exhaust valve is set to open when the crank is 38 degrees away from its bottom position and closes 7 degrees on the down stroke. The inlet is set to open 11 degrees over the top position and closes 19 degrees over the bottom position. The diameter of the crankshaft is 1½ inches. Three bearings only are provided, the total combined length being 9 inches. The crankshaft is constructed from nickel-chrome steel and the bearings are lined with white metal, both main and big ends of connecting rods. The cams are formed solid with the camshaft and the latter runs in plain gun metal bearings, through which the shaft will slide endwise.

The lubrication system is interesting for the reason that the Wolseley company originated the trough system and it has stood the test of time in quite a satisfactory manner. Immediately below the big ends of the connecting rods troughs are provided and into these the oil is supplied from a small gear pump. The connecting rod ends are provided with scoops or dippers, and the ends of the gudgeon and cams are all lubricated by the splash set up. The main bearings are fed also from the pump by means of a pipe running outside the crankcase; oil from the pipe runs into cups provided for each bearing, and the surplus oil is taken by a duct to the sump. The timing gears are fed in like manner from the pump, the surplus again returning to the sump. A pressure gauge is

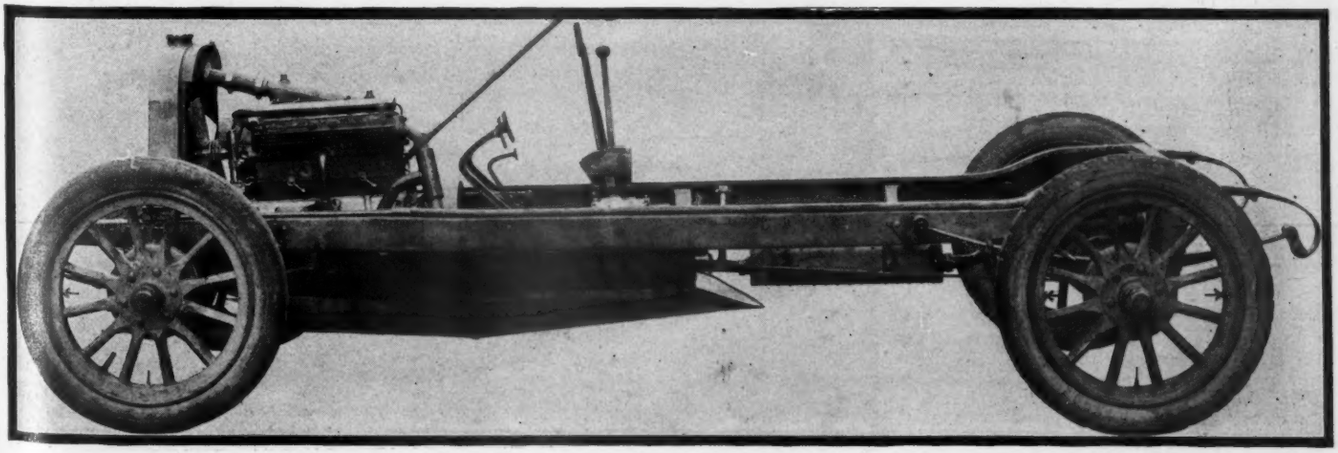
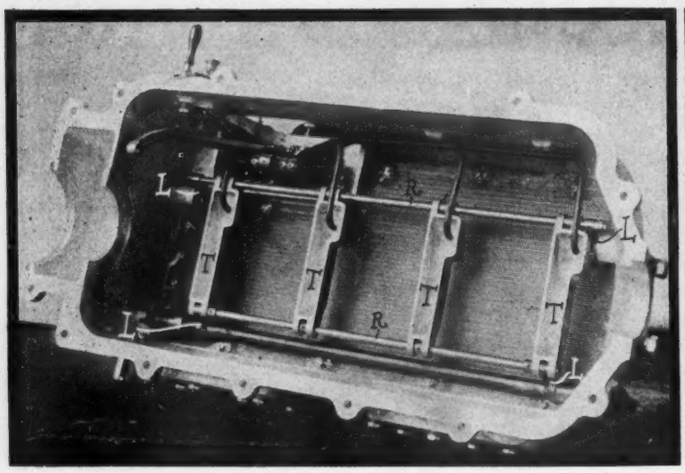
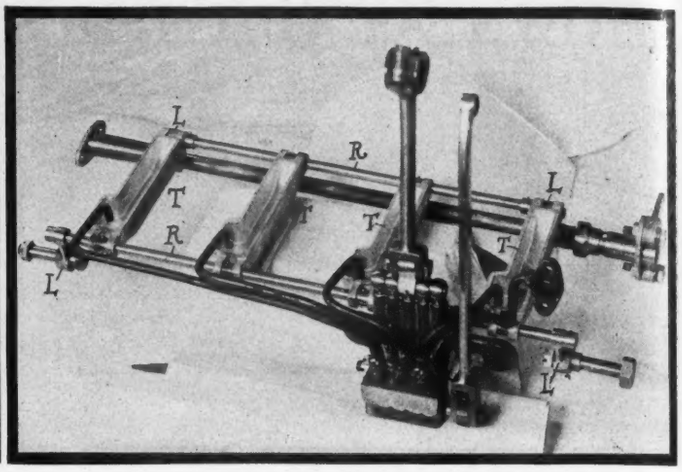


FIG. 4—THE 12-HORSEPOWER ARGYLL CHASSIS FITTED WITH WORM DRIVE. THE FOUR-CYLINDER MOTOR IS MADE UP OF A MONOBLOC CASTING AND TILTS FORWARD, AS THE ILLUSTRATION SHOWS, SO THAT WHEN THE CHASSIS IS LOADED THERE IS A STRAIGHT-LINE DRIVE TO THE REAR AXLE. THE STRAIGHT-LINE DRIVE IS VERY DESIRABLE BECAUSE OF THE WORM DRIVE





FIGS. 5 AND 6—ONE OF THE BIG IMPROVEMENTS IN THE 1911 DAIMLERS FITTED WITH THE KNIGHT SLIDE-VALVE MOTOR IS THE NEW OILING SYSTEM—BENEATH EACH CONNECTING ROD IS A MOVABLE TROUGH INTO WHICH THE OIL DRIPS AND WHICH TROUGH CAN BE MOVED IN UNISON WITH THE THROTTLE OPENING GIVING MORE OIL WHEN MORE GAS IS GIVEN

fitted on the dash and the oil passed through a filter on being drawn from the sump. For filling a substantial standpipe is fitted and a cock placed at the maximum level indicated when a sufficient amount has been poured in. The system is just about as simple as can be and the proportions of the troughs and dippers have been carefully determined to give just about the right amount of lubrication at all speeds. To prevent leakage of oil, stuffing boxes and caps are arranged for where necessary.

The carbureter is of the three-jet type, the third jet coming into work as the throttle is opened. The jet is only used for maximum power. To prevent any foreign matter getting into the fine jet wash leather as well as gauze is employed as a strainer. The air valve is arranged above the throttle so that the descending air meets an ascending rich mixture and is controlled by spring pressure, which can be regulated from the dash. The intake manifold is water jacketed and the maximum diameter is 1¾ inches. The cylinders are arranged to fire in the order of 3, 4, 2, 1. Gasoline is fed to the carbureter by pressure, maintained by a small air pump combined with the oil pump. The method of employing the exhaust pressure for the gasoline tank is now quite obsolete.

The engine and gearbox are carried by the main frame members. As stated in my previous article, the employment of underframes is rapidly becoming less, most if not all the new designs being found without it. The gearbox is fitted with four speeds and at 1,000 revolutions of the motor the road speeds are 8, 15, 21 and 32 miles per hour. The final drive is by worm and wheel in the lower position and the propeller shaft is fitted with two enclosed universal joints and a universal joint is provided between the engine and gearbox.

The metal-to-metal disk clutch runs in oil, there being eighteen plates of a diameter of 6¾ inches for the inner set and 5¾ inches for the outer set. The chassis weight is 1,848 pounds.

The 12-horsepower chassis is similar to the 16-20. It is also worm driven and the engine and gearbox have a sloping axis to reduce the work of the universal joints. The front and back road wheels are mounted on Timken roller bearings. It should be remarked that the side thrust on the rear wheels is taken by the differential thrust collars through the medium of the driving shafts. The road wheels are 32 by 3½ and at 1,200 revolutions of motor the three-speed gearbox gives 7½ to 15 and 26 miles per hour. The range of top gear or level is from 8 to 36 miles per hour. The chassis weighs 1,680 pounds.

The Knight-Daimler Types

There are seven Daimler models, all fitted with the Knight sliding sleeve motor. These models are 12-horsepower, 60 by 114, 15-horsepower, 80 by 130, 23-horsepower, 80 by 130 six-cylinder; 25-horsepower, 101 by 130, 38-horsepower, 124 by 130, 38-horsepower, 101 by 130 six-cylinder; 57-horsepower, 124 by 130 six-cylinder.

Worm drive is used on all but the 38 and 57-horsepower models. The type of worm employed is of the well-known Lanchester or concave type. The worm is constructed of steel and the worm wheel of phosphor bronze. All the worm-driven cars are constructed with inclined engines and gearboxes, so that the drive from crankshaft to rear axle is in a straight line. Leather cone clutches are a standard feature. Strange to say, the Daimler company has not yet come into line with other leading makers by providing that most necessary fitting an accelerator pedal and still persist in constructing all cars with three speeds only.

Needless to say the Daimler cars are all fitted with the Knight motor. The new feature in connection with this engine consists in connecting the lubricating system with the throttle, so that the engine obtains more oil with increase of load. The bottom half of the base chamber is constructed to carry about 2 gallons of oil. A small plunger pump is situated in the base chamber, in the large engine several pumps are fitted, which send the oil into

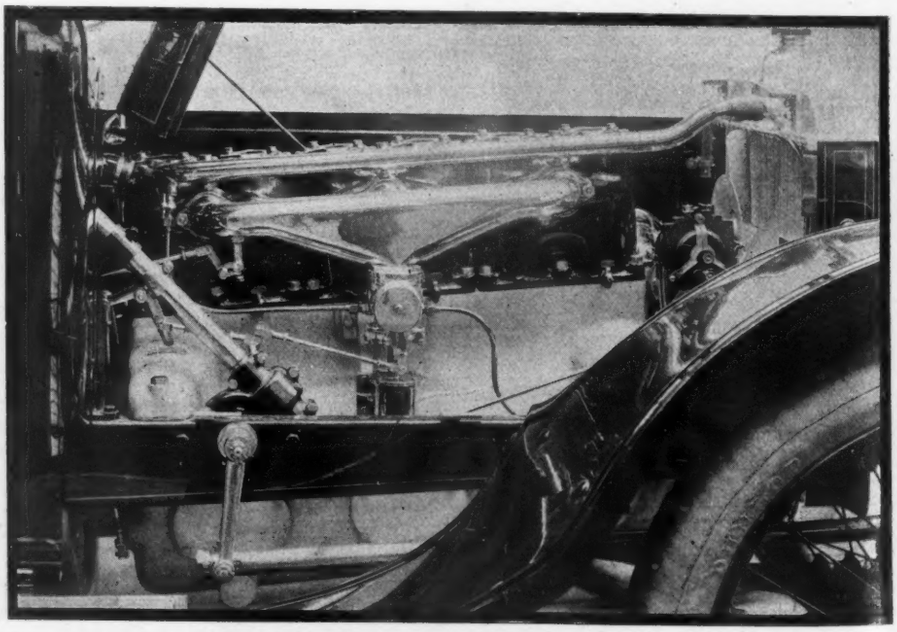


FIG. 7—THE KNIGHT SLIDE-VALVE MOTOR FITTED IN THE 1911 DAIMLER CHASSIS—NOTE THE TILT DOWNWARD TO THE REAR OF THE MOTOR, WHICH IS DONE IN ORDER TO HAVE A STRAIGHT-LINE DRIVE FROM THE CRANKSHAFT TO THE WORM-DRIVEN REAR AXLE

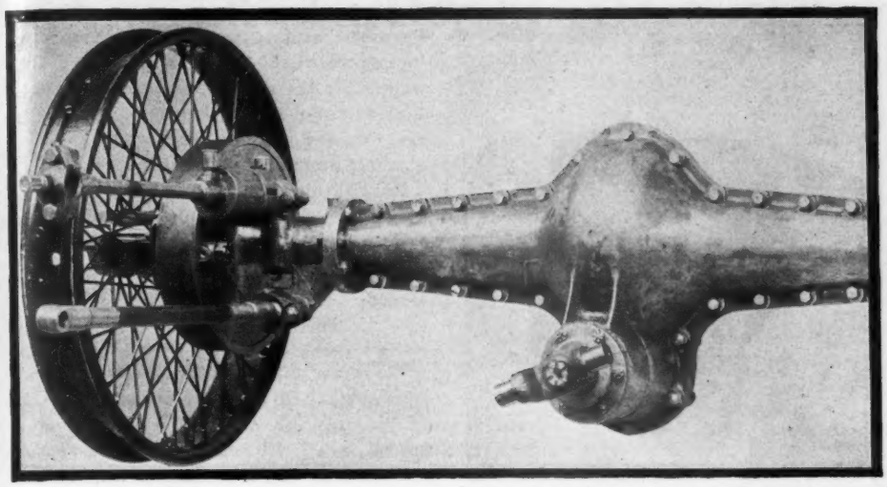


FIG. 8—DEASY PRESSED STEEL REAR AXLE WITH WORM DRIVE—IN THIS AXLE THE HOUSING IS FORMED FROM TWO STAMPINGS, WHICH ARE BOLTED TOGETHER AS ILLUSTRATED, EACH STAMPING INCORPORATING A PART FORMING THE HOUSING FOR THE WORM—THE WORM IS LOCATED UNDER THE WORM WHEEL, IN WHICH POSITION THE LUBRICATION IS BETTER CARED FOR BUT THE AXLE CLEARANCE REDUCED

troughs T, Fig. 5, situated immediately beneath the ends of the connecting rods. These latter are provided with scoops, which dip into the oil and splash it up to the pistons and sleeves. The main bearings are supplied by the amount that drips into pockets over each bearing. The foundation plate of the troughs T is anchored upon two rods, R and R, which in turn take bearings upon four short levers L, one at each corner. By these means the troughs can be raised or lowered in accord with the movement of the throttle.

The 15-horsepower car is one of the popular sizes. The crankshaft has five bearings of a total aggregate length of about 250 millimeters and a diameter of 45 millimeters. The crankshaft is a vanadium chrome steel forging and finished by grinding only, the webs being only cleaned up. This method of dealing with crank shafts is not generally carried out in this country. All bearings are lined with white metal. The pump and magneto are driven by a cross shaft by means of skew gears. This is quite a neat arrangement, as it renders both the pump and the magneto very accessible.

The gearbox gives the following ratios: 4.37 to 1 on top gear, 7.15 to 1 on second gear, and 15.8 to 1 on low and reverse gear. Transmission from the gearbox to the back axle is by double-jointed propeller shaft; a torque rod is not fitted.

The 12-horsepower Daimler is a new model, constructed on the lines of the 15-horsepower, with the exception of the engine. The cylinders of the 12-horsepower are cast monobloc, but with separate heads. The crankshaft is carried by three large-sized ball bearings, the central bearing being secured by providing a split bushing, which fits in the central portion of the crankshaft and supports the ball bearing.

The brakes of all Daimler cars are lined with fabric and as heretofore the pedal acts on the rear wheel brakes and the hand lever operates the brake behind the gearbox. The hangers at the back of the front springs are constructed to provide for lateral movement, as shown by Fig. 15. The grease cups should be noticed, as the fitting of these is quite general on all British cars to all spring bolts and shackle pins.

Rolls-Royce Six-Cylinder

The Rolls-Royce firm confines itself to one six-cylinder model. The six cylinders of the engine are 4½ inches bore by 4¾ inches stroke, developing approximately 48 horsepower at 1,200 revolutions. Forced lubrication is provided for the engine, oil being supplied by a positive valve pump, arranged to give a constant pressure of oil. The pressure may be regulated from 1 to 20 pounds per square inch by a simple adjustment and thus the quantity of oil delivered to the engine may be varied. The oil is delivered to the three main bearings and is forced through them along channels drilled in the shaft to the connecting rods and small intermediate bearings.

Two very complete sets of ignition are provided, high tension with trembler coil and battery and high-tension magneto. The battery ignition is chiefly fitted to provide an easy means for starting the engine, which if the engine is warm can generally be done by merely turning on the switch.

The general features of the Rolls-Royce cars are exactly the same as during the past season, with one or two modifications in details. A rather neat arrangement has been carried out in connection with the operation of the ignition switches. These switches are placed at the bottom of the steering column and a rod is brought

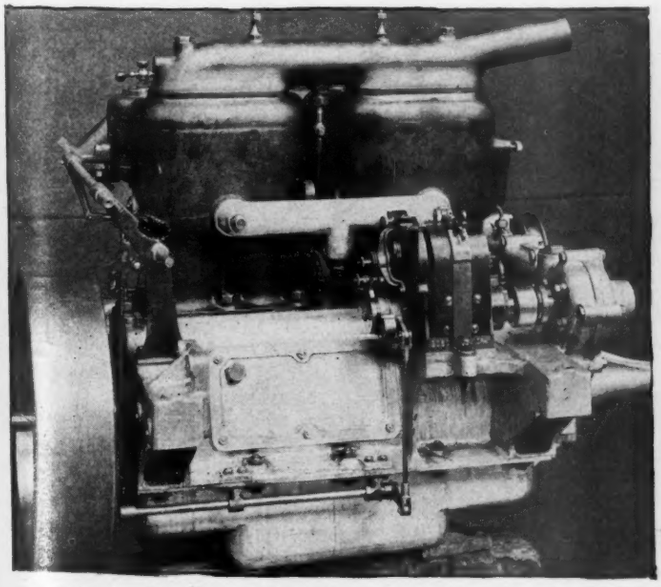


FIG. 9—THE FOUR-CYLINDER WOLSELEY 16-20-HORSEPOWER MOTOR USES CYLINDERS CAST IN PAIRS WITH VALVES ON ONE SIDE—A FEATURE OF CONSTRUCTION IS THE ONE PIECE FORMING THE JACKET COVER FOR BOTH CYLINDERS AND SERVING FOR WATER PIPE AS WELL.

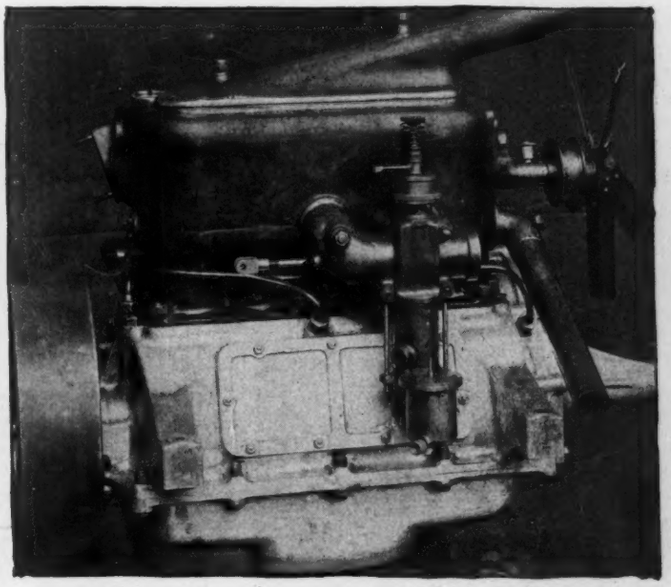


FIG. 10—THE 12-16-HORSEPOWER WOLSELEY MOTOR WITH FOUR CYLINDERS CAST IN ONE BLOCK—THERMO-SYPHON WATER CIRCULATION IS USED ASSISTED BY FAN—ON BOTH OF THESE MOTORS THE CIRCULATING SYSTEM OF OILING IS USED—THE CARBURETOR IS AN INTERESTING ONE

up through the center of the column, terminating in a neat knob B, Fig. 16, right in the center of the steering wheel. By turning this knob to the right or left the magneto or coil ignition switches are operated. It will be noticed that on the steering column there are three levers, one L1 for the ignition, one L2 for the governor and throttle, and the third L3 connected to the jets of the carbureter, whereby same can be adjusted to give more or less gasoline.

Metallurgique Belgian Product

The 14-horsepower Metallurgique, 75 bore by 110 stroke—2.95 by 4.33 inches—is a car which may be taken as typical of the best type of the Belgian products. Cooling is provided for by natural circulation, the diameter of the intake and outlets of the cylinders being 1.18 inches and 1.57 inches at the radiator. Three crankshaft bearings are provided for the main journals, being 1.18 inches in diameter and the aggregate length of the main journals is 6.88 inches. The big end bearings are 2.12 inches long. Valves of large area are employed, the outside diameter being 1.77 inches, giving an effective diameter of about 1.37 inches. The valves are very lightly constructed, but considerable strength is obtained by the use of a very large radius at the junction of the head and the stem. The flywheel is 15.74 inches in diameter and is fitted with vanes for induced draught through the engine. The clutches are of the internal expanding type. This clutch is known as being devoid of end thrust and provides a large and durable wearing surface. Lubrication is of the forced feed type, with drilled crankshaft. The gearbox is provided with three speeds and the ratios are as follows: First speed 15 to 27, second speed 23 to 19, and fixed drive 18 to 38.

Many interesting points are found in the 25-horsepower, six-cylinder Sheffield-Simplex, which has a bore and stroke of 3.34 by 5 inches. The crankshaft is run in four bearings only, which is a somewhat new departure. The camshaft and magneto are driven in rather a novel fashion. At the forward end of the crankshaft, Fig. 12, a worm wheel W is fitted, driving a worm mounted at an angle of 45 degrees to the crankshaft and its piston being marked at W2. The worm in turn drives a worm wheel W1, coupled to the crankshaft. The wormshaft is extended and from it the oil pump and magneto are driven, the magneto being carried on an inclined bracket B, page 27, so that the breaker box is accessible. Neither of the worm wheels is keyed to its shaft, but rotates on a sleeve carried by the distribution gearcase and is coupled to its respective shaft by driving dogs D. The wheels are therefore not overhung and the manufacturer claims that by this means he has obtained a silent gear.

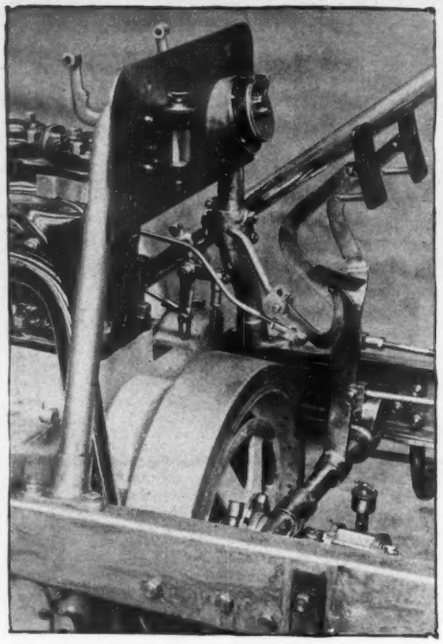


FIG. 11—ARRANGEMENT OF PEDALS AND DASH ON 1911 DAIMLER CARS. THE USE OF THE CARE CLUTCH IS NOTED

Sheffield-Simplex Lubrication

Lubrication is a combination of forced feed and splash—that is, forced to the main bearings, the splash being relied upon for the connecting rods, for which troughs T, Fig. 13, are provided, the oil reaching these troughs by oil leads L from the main bearings. As shown at Fig. 13, an end section of the motor, there is an adjustment handle H at the top of the crankcase controlling a valve which regulates the oil level within the crankcase proper. The oil filler cap F is also shown. At the right side appears the air pump AP for providing pressure on the gasoline in the fuel tank. The pump drives direct by plunger piston P from the camshaft. The air enters the pump cylinder through the side openings A, the check valve V is a 45-degree type seated by spring. There is a safety valve V1 for use when the pressure becomes too high. A further motor detail is the multiple ignition cable K. The carbureter is provided with a choke tube V, which operates as the suction increases. An additional sleeve V1 is provided round the choke tube, which is also lifted, the weight of which is determined in accordance with the increased speed end suction. A three-speed gearbox is arranged on the back axle, the three ratios being 4 to 1, 7.3 to 1, 13.35 to 1.

The clutches are of the multiple-disk type and the propellorshaft is incased in a tubular casing, which takes up both torque and thrust. Both foot and hand brakes are fitted on the rear wheels. All the wheels are detachable and of the Rudge-Whitworth type. Another point in

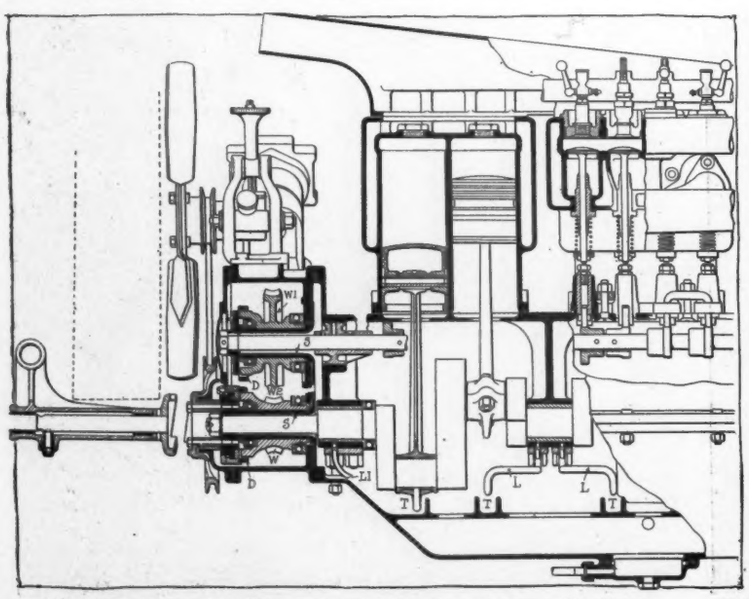


FIG. 12—FRONT END OF SHEFFIELD-SIMPLEX NEW PATTERN SIX-CYLINDER MOTOR SHOWING OIL TROUGHS T AS OIL LEADS L FOR LUBRICATING THE CONNECTING RODS. THE CAMSHAFT IS DRIVEN FROM A WORM WHEEL W ON THE CRANKSHAFT BY MEANS OF A WORM LOCATED AT POSITION W2, WHICH WORM MESHES WITH WORM WHEEL W1 ON THE CAMSHAFT

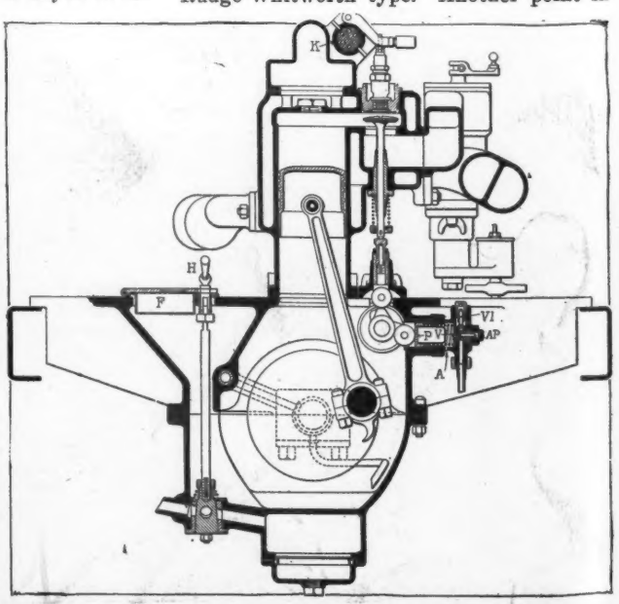


FIG. 13—END SECTION OF SHEFFIELD-SIMPLEX MOTOR SHOWING THE MULTIPLE IGNITION CABLE K, WITH ITS SIX LEADS. AT THE RIGHT IS THE AIR PUMP AP FOR MAINTAINING PRESSURE IN THE GASOLINE TANK. THE OIL LEVEL IN THE CRANKCASE IS REGULATED BY HANDLE H, WHICH CONTROLS A VALVE IN THE BASE OF THE CASE. THE OIL FILLER CAP F IS ALSO SHOWN

BADGER COURTS' OPINIONS IN VELIE CASE

connection with this chassis is that the frame is straight from end to end and has no inset at the front end. This system of building the frame is gaining ground, especially for the higher powered cars; it certainly adds to the rigidity of the structure.

AUSTRALIAN DUTIES

Washington, D. C., Nov. 12—According to the Daily Consular and Trade Reports, a customs order of September 3, 1910, provides that the duty on motor cars in Australia shall be levied on the home-consumption value in the exporting country of each part, even when such parts have been assembled and imported into the commonwealth as complete cars. The accompanying invoices must set out, in addition to the price of the complete car, the country of origin, and the prices ordinarily charged for the chassis, body, footboards, mudguards, tires, and lamps when sold separately for home consumption in the country whence exported. A declaration on the face of the invoice by the manufacturer, exporter, or authorized agent in the following form is required:

I, —— manufacturer or supplier of the goods described in this invoice, do hereby declare that the prices shown thereon for the complete car and for the several parts are not less than the prices charged to purchasers of similar cars and parts for home consumption in this country.

The import duty on motor cars and parts in Australia is as follows: Bodies for motor cars and wagons, and parts thereof not specified, 30 per cent ad valorem when imported from the United Kingdom and 35 per cent ad valorem when imported from other countries; chassis for motor cars and wagons, not including tires, free when imported from other countries; lamps and lanterns, 15 per cent from the United Kingdom and 25 per cent from other countries; rubber tires, 20 per cent from the United Kingdom and 25 per cent from other countries; footboards and mudguards are subject to the same duty as the chassis, while motor car supplies, other than parts of chassis, are dutiable as the body.

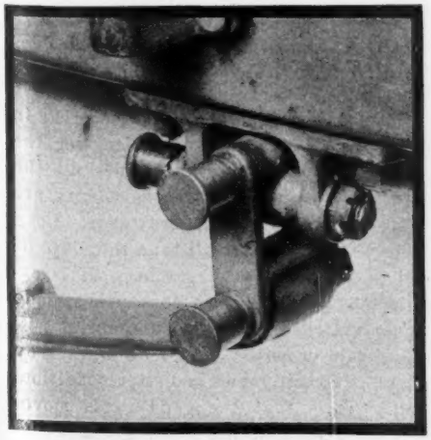


FIG. 15—SPRING SHACKLES ON DAIMLER CARS AT REAR END OF FRONT SPRINGS. THESE SHACKLES ALLOW FOR A SIDE MOVEMENT OF THE FRAME AT THIS POINT

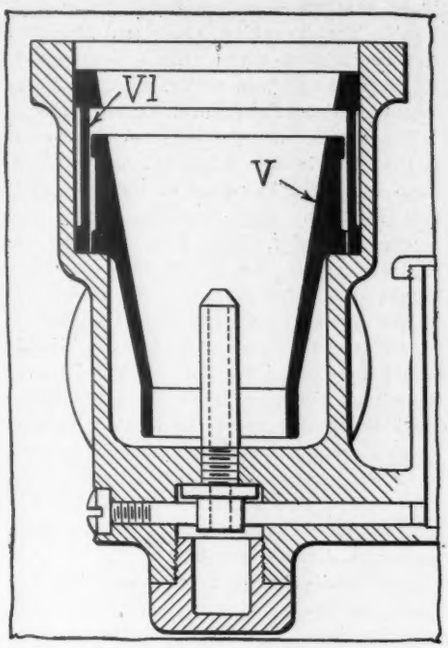


FIG. 14—MIXING CHAMBER IN SHEFFIELD-SIMPLEX CARBURETER

NEW YORK, Nov. 16—Special telegram —Two particularly important opinions of high courts have been filed recently in connection with the litigation instituted by the Velie Motor Vehicle Co., of Moline, Ill., against the A. L. A. M. and its constituent members and its former representative in Milwaukee, Wis., the Kopmeier Motor Car Co., of that city.

The first of the decisions is embodied in the opinion of Chief Justice Winslow, of the Wisconsin supreme court, in which the court holds favorably to the plaintiff in a matter of procedure. In the other case, which was brought in the federal circuit court, eastern district of Wisconsin, Justice Quarles sustains the demurrer of the Kopmeier Motor Car Co. and holds adversely to the merits of the Velie company's claim.

In the suit against the A. L. A. M., the Pierce-Arrow Motor Car Co., the Chalmers Motor Car Co., the Pope Mfg. Co. and the American Automobile Co. filed writs of prohibition to nullify service made upon their representatives in Milwaukee on behalf of the original suit of the Velie company. The method taken was to invoke the power of the supreme court of the state to prohibit the circuit court from proceeding with the cases against the defendants.

Chief Justice Winslow holds that the relief prayed for is not proper and peremptorily denies the motion to restrain the circuit court without going into the merits of the case. The status of the litigation is placed at the same level it would have assumed if no question had been raised as to the service upon the defendants.

In the federal case the decision is more radical. The Velie company entered suit against the Kopmeier Motor Car Co. to recover damages for the alleged breach of an executor contract based upon an agreement set forth in the contract between the parties, that the Kopmeier Motor Car Co. agreed to handle the Velie product in the Milwaukee territory and under the agreement promised to buy at least fifty motor cars. The justice holds that contract as set forth is not a contract of sale, but rather one of agency. The foundation for his reasoning is the fact that in the contract it is provided that the Kopmeier concern is required to perform certain acts with regard to the motor cars, alleged to have been sold under terms of the contract long after they would have passed absolutely to the Kopmeier company if the contract had been one of sale and not of agency.

The defendant company filed a general demurrer to the complaint and the court sustains the demurrer, which defeats the suit so far as the allegation of sale to the Kopmeier company is concerned. In the suit against the four members of the A. L. A. M. which was decided favorably to the complainant's contention, a dissenting opinion has been filed by Judge Timlin. which was concurred in by two other members of the bench.

BURNS IS INTERESTED

Burns, Ore., Nov. 12—Although the first motor car did not make its debut in Burns, until last spring, there are now more than a score of machines in this city. Last week a parade was held in conjunction with the Harney county fair and proved one of the biggest features of the week, Mrs. Archie McGowan, in a Ford car, winning the first prize. Motor cars, all things considered, soon will be one of the most prominent factors in the development of Burns, which is in Harney county, and the interior of the state, it is believed. Many ranchers in that vicinity have placed orders for cars as the result of demonstrations and the recent parade. On account of the high altitude, slight rainfall and practically level country, it would be an easy matter to travel about in a motor car nearly the entire year through.

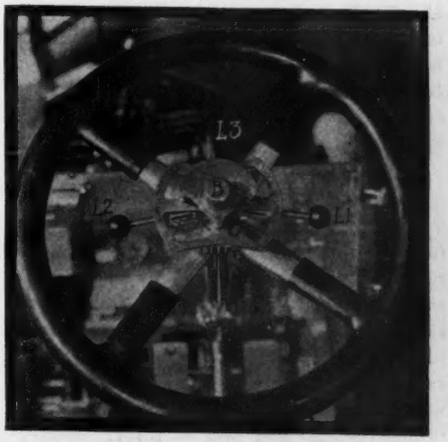


FIG. 16—ROLLS-ROYCE STEERING WHEEL, SHOWING IGNITION LEVER L1 AT THE RIGHT, THE GOVERNOR LEVER L2 AT THE LEFT, AND THE CARBURETER LEVER L3 IN FRONT

Sensational Time On Dirt Track

PHOENIX, ARIZ., Nov. 10—Motor day at the Arizona state fair was marked by what is undoubtedly the most sensational mile ever seen on a dirt track. Five cars, the Apperson, Mercer, Duro, Parry and Velie, started in the 15-mile handicap, with the Apperson on scratch. From the start the Jackrabbit began gaining. The Duro car, moving at a mile a minute, had a handicap of 25 seconds. The track was inches deep with dust and the cars were hidden at the turns by the clouds of dirt. The first few miles were made in 59 seconds each, but the Duro still led. On the sixth mile the Apperson had drawn up to within 100 yards of the Duro and to beat it to the wire Hanshue shot through the dust for a mile in :57 1-5. The Mercer still was ahead and in catching this car on the seventh mile the Apperson turned the mile in :56¼. This was on a dust-clouded track, with four others running at the time.

The largest crowd of the Arizona fair week gathered for the races. The immense grand stand was packed and the fence was lined with motor cars, buggies, wagons, Indian ponies and every other means of conveyance. People came from all parts of the territory and it was necessary to close the stand gates after 2 o'clock. Five thousand people could not gain admission.

The first race carded was the 25-mile event for cars of 301-600 cubic inches piston displacement. The Apperson, Rambler and Kisselkar faced the starter. The Franklin, Velie and Ohio withdrew for various causes. Hanshue jumped into the lead at the gun and proceeded to make a runaway race of it, having a sixteenth of a mile lead on the first circuit. The Rambler fell into second place. The Apperson had opened a big gap in the first 5 miles and was taking the turns slowly. Time 5:26; Rambler, 5:39; Kisselkar, 5:46. Hanshue continued to hold his pace and finished 10 miles in 10:47½; Rambler 11:13 and the Kissel 11:25. The next 5 miles was the same story. Time 16:12, 16:47, 17:06. The Apperson lapped the Kissel in front of the stand on the nineteenth mile. Time for 20 miles: Apperson 21:31, Rambler 22:18, Kissel 22:43. Hanshue saved his car the last 5 miles and won handily in 26:55.

Five left the tape in the 10-mile race for cars of 201-300 piston displacement. The Duro was first to show in front, followed by the Ohio and Mercer. On the second circuit the Mercer was second and the Pope-Hartford moved from fifth to third on the third mile. The Ohio went into the paddock on the fifth mile with carbureter trouble. The leading Duro went the 5 miles in 5:24. The Duro maintained its lead and won in 10:37. Mercer second; Pope third.

The 15-mile free-for-all brought out only three starters—the Apperson, Pope and Ford. The Franklin, Ohio and Abbott-Detroit failed to start. The Apperson was off in front and won easily, with the Pope second and the Ford third. Time 16:10.

The 15-mile race for the first three cars in the Phoenix race was a hot battle. The Pope had three bad tires at the start and the Franklin was running with one cracked cylinder. The Pope was off in the lead, while the Kissel and Franklin fought it out for second. The Kissel led on the first mile. On the third the Franklin had moved ahead and then the Kissel regained its position. For the next 5 miles the second two were lapping. After fighting side by side until the tenth mile the Franklin, well driven by Guy Irwin, opened up a car's length on the Kissel. The Pope maintained a good lead and won by a sixteenth of a mile. The Franklin was second by a car's length.

The 10-mile handicap was won by the Parry, handicap 2½ minutes, by 50 feet over the Ford. The Duro was third. The Parry caught the leader on the last lap.

In the mile time trials Hanshue sent his Apperson the circuit in :57 1-5, shutting down on the turns. The track was so hard it was hard to keep the car from skidding on the turns.

The day's sport closed with a 15-mile handicap, which furnished the most sensational mile of the day. In order to overcome the Duro, a-mile-a-minute car, Hanshue drove the sixth mile in :57 despite clouds of dust, which hid the car from view for a sixteenth of a mile and followed this with a mile in :56¼, the most spectacular performance ever given on any track, it is believed. Summary:

Twenty-five miles, 301-600 class, for cars competing in Los Angeles to Phoenix road race—Hanshue, Apperson, won; Sheriff, Rambler, second; Herrick, Kisselkar, third. Time by 5 miles: 5:22, 10:47½, 16:12, 21:31, 26:55.

Ten miles, 201-300 class, Phoenix race cars—McKeague, Duro, won, time 10:37; Bigelow, Mercer, second, time 10:50; Gage, Pope-Hartford, third, time 11:06; Duell, Parry, fourth, time 11:52.

Fifteen miles, free-for-all—Hanshue, Apperson, won, time 16:10; Gage, Pope-Hartford, second, time 16:27½; Stearns, Ford, third, time 21:15.

Fifteen miles, first three to finish in Los Angeles to Phoenix race—Gage, Pope-Hartford, won, time 16:15½; Irwin, Franklin, second, time 16:30⅘; Herrick, Kisselkar, third, time 16:31½.

Ten-mile handicap—Dull, Parry, handicap 2½ minutes, won; Stearns, Ford, handicap 3 minutes, second; McKeague, Duro, scratch, third. Time 10:20½.

Time trials, 1 mile—Hanshue, Apperson, :57⅕, McKeague, Duro, 1:00⅗; Bigelow, Mercer, 1:02; Sheriff, Rambler, 1:11.

Fifteen-mile handicap—Hanshue, Apperson, scratch, won; McKeague, Duro, 25 seconds, second; Bigelow, Mercer, 1 minute, third. Time 14:53.

SPOKANE IN GOOD SHAPE

Spokane, Wash., Nov. 12—Nowhere is the tremendous success of the motor car in Spokane and the inland empire better evinced than in the increase in the number of agencies and factories represented in the past 2 years. Two years ago half a dozen dealers, motor pioneers of Spokane, held sway over a limited field. Today the possibilities of that field have just begun to grip the distributor and five times as many dealers are selling cars from five times as many factories. Spokane can no longer be called the wild and woolley west of the motor industry. Two years ago such charges were frequently and truthfully made, but the season just closed marked the departure of that period and the entrance upon a period of almost unhoped for prosperity.

That 1911 is to be even a more satisfactory year is evinced by the actions of three Spokane dealers. In the face of money tightness and ravings of certain financiers regarding the relation of a probable panic to the motor industry, C. H. Hornburg has contracted for 200 Maxwells for 1911, the Standard Motor Co. has ordered 125 Stoddard-Daytons, with a privilege of increasing the order to 185 cars, while Stanley W. Smith declares that seventy-five Elmores and probably more will be the 1911 distribution in Spokane territory. All these figures represent a big increase over 1910, and practically every dealer in the city expects to duplicate the mark to a greater or lesser degree.

While the row generally is used to express the centralization of the dealers into a certain district, it is a misnomer in Spokane for the motor venders in Spokane are scattered over an area 4 square miles. True, the majority of the dealers are finding their way to West Sprague, First and Second avenues, but the percentage of the thirty-one is not sufficiently large to stamp any or all of those thoroughfares the row.

GOSSIP FROM DETROIT

Detroit, Mich., Nov. 14—That the people of this community are fully awake to the advantages of good roads was amply demonstrated in the election of last Tuesday, when the proposition to bond Wayne county for $2,000,000 for road-building purposes carried by a large majority. It was a great victory for the Detroit board of commerce, which fathered the project. It also served to show what a powerful force the motor car industry has become here, for the united support and co-operation of these interests were important factors in the success of the issue.

The populace in general and motorists in particular have cause to rejoice, for the vote means that within 5 years all the principal thoroughfares in the county are to be converted into modern roads. Long stretches of concrete will take the place of mud puddles and sand patches. It is expected, now that Wayne county has made such a splendid start, other counties will follow suit or will at least do what they can to put their roads in better condition. Certain it is that the good roads movement in Michigan has been given a decided impetus by the victory of the bonding proposition in Wayne.

Aside from the bond issue, perhaps the most interesting contest in the election to the motor car men was the fight of State Senator John N. Anhut, who formerly was actively connected with the industry as president of the Anhut Motor Car Co., now the Barnes, for re-election. Although he put up a stiff campaign and spent a great deal of money, Anhut was defeated by his Democratic opponent, James H. Lee.

Plans for the 1911 show, to be held in the Wayne pavilion, January 16-21, under the auspices of the Detroit Automobile Dealers' Association, already are taking shape. They were outlined in a general way at a meeting of the D. A. D. A. directors last Thursday night, in the association's new offices at 501 Bowles building. Manager Walter R. Wilmot declares that the coming show positively will be the most elaborate and attractive ever held in Detroit; in fact, it will compare favorably with any exhibition that has ever been given in this country, he says. Plenty of support is promised.

Special attention will be given to decorations this time. The directors decided to spare no expense in this regard, and Mr. Wilmot was instructed to get busy on the details of the decorative scheme without delay. Several slight changes have been made in the rules governing the show. Space application blanks are in course of preparation and will be distributed among the dealers at an early date.

Herbert W. Baker, publicity and industrial commissioner of Ottawa, Can., is here for the purpose of interesting local motor car manufacturers in the establishment of Canadian branches in Ottawa. He is already negotiating with six large concerns.

"Canada is ripe for motor car factories," said Mr. Baker. "East of Ottawa the country is all virgin territory for the industry, and the American manufacturers who want to participate in Canadian prosperity must establish branches there, and no city in the dominion offers any better natural advantages than Ottawa, with her great water power facilities."

It is understood that plans are nearly complete for the merging of the Baynes Carriage Co., Ltd., of Hamilton, Ont., with the American Road Machine Co., of Canada, Ltd., and certain Detroit interests. The consolidated concern will be known as the Acme Motor Carriage Machinery Co., Ltd., with a capital of $1,000,000. It will manufacture touring cars, taxicabs and commercial vehicles. The main office will be in Hamilton for the present. Here the car bodies will be made and the parts assembled. Later the plants will be grouped, which will mean a big reduction in operating expenses. The American Road Machine Co., of Canada, is a branch of the American Road Machine Co., of Kennet Square, Pa., which absorbed the Good Roads Machinery Co., of Hamilton, 2 years ago.

DeHymel Meets Death In Race

SAN ANTONIO, TEX., Nov. 13—So far as the racing itself was concerned the 3-day meet at the international fair on Friday, Saturday and today was a success. The speed tourney, however, was marred by a fatality Saturday, when Tobin DeHymel, the best driver in the southwest, who competed in the Vanderbilt and Fairmount park road races, was killed when a front wheel of his Stoddard-Dayton gave way in a handicap race in which he was scratch man. The meet came to an end today with the running of a 3-hour race, which was won by Dunn in a Marion, who covered 155.25 miles in that time, an average of 51.75 miles per hour. DeHymel was the star of the first day's racing, with Mortimer Roberts in the Abbott-Detroit a good second.

Barely 100 yards ahead of the little Hudson and running better than at the start of the long chase, Dunn drove his Marion across the finish line this afternoon in the 3-hour race, winner over five other starters. Dunn, during the 3 hours of running time, covered 207 laps, a distance of 155.25 miles, or an average for the ¾-mile track of 51.75 miles an hour, including time out on two occasions. He won the $700 first money and the $100 for finishing first in his class. This event was the climax and ended the meet. Up to the last few minutes the little Hudson, with Ben Johnson, winner of the 6-hour race of last fall, was out in front and had been running safely, secure in a lead of several laps. Then a throttle rod stuck on him, losing him a half lap. This he made up in a furious drive and in the dark his goggles became clouded with the grime.

Of the six starters only four finished, the third being the Abbott-Detroit, with Roberts at the wheel. First to come to grief was the little Buick. Slagle was driving a frantic race when at the south bend he lost control in taking the bank. The car got out of his control and dashed over the bank. His left leg was broken in two places, but his injuries were not believed tonight to be at all serious. This accident occurred almost exactly where DeHymel was killed. It made three mishaps for the meet, there being a slight one in practice to a brother of the dead driver.

Next to go out was the little Cutting, with its timing gear smashed. The Buick came to grief at 3:34 o'clock, not having run a full hour. The Cutting dropped out at 5:25 o'clock. The Marquette-Buick, with Meleun at the wheel, went out, but came back in and finished at a walk. The Hudson was first in its class, getting $300 in all, including second money.

As they lined up at the starting place each driver dismounted and stood beside his car, while the crowd as one person arose and with uncovered heads stood while the band played "Nearer My God to Thee" in memory of Tobin DeHymel. Then Starter Fairfield gave the sign and the race was on. Summary of the meet:

Car and driver	Miles
Marion, Dunn	155.25
Hudson, Johnson	154.50
Abbott-Detroit, Roberts	151.50
Marquette-Buick, Meluen	122.25
Cutting, Clark	122.25
Buick, Slagle	36.75

The accident in which DeHymel was killed occurred yesterday afternoon in a handicap race. DeHymel was in front after overtaking all those who started ahead of him. His was the scratch car and in a furious drive in the 12-mile event he was at last out in front. Instead of cutting down his speed he appeared to be going after a record. As the car took the far pitch of the track, where the bank is over 10 feet high, his front wheel, which had been seen to wobble as he passed the grand stand, gave way.

As DeHymel was thrown clear he carried the steering wheel with him. The first arrivals on the spot carried him hastily out of the way of the other cars and the race was stopped. Death followed in a few minutes. DeHymel had been the big winner of the meet in his Stoddard, having already taken nearly $1,000 in prizes. He finished third in the Fairmount park road race last month and was the acknowledged premier race driver of the southwest. He was about 21 years of age. The accident, while no fault of the track, occurred where three cars last season, DeHymel's among them, came to grief. Saturday's results:

Class E., 300 cubic inches and under, twelve laps, 9 miles—Geary, Stoddard-Dayton, won; De Hymel, Stoddard-Dayton, second; Fred Meleun, Buick, third. Time 9:32⅗.

Class B, 231-300 cubic inches, twelve laps, 9 miles—Clark, Cutting, won; Dunn, Marion, second; Plummer, Marion, third. Time 9:53.

Class E, 450 cubic inches and under, 12 laps, 9 miles—Meleun, Buick, won; Clark, Cutting, second. Time 9:00.

Class D, free-for-all, sixty laps, 45 miles—Slagle, Cutting, won; Meleun, Marquette-Buick, second; Dunn, Marion, third. Time 48:08⅗.

Twelve-mile handicap—Called off because of fatal injury to Tobin De Hymel.

DeHymel won just half of the cash prizes of $1,050 Friday afternoon. Driving his big Stoddard-Dayton 50 and his little Stoddard-Dayton 40, he captured both moneys in the mile trials in these two cars. Mort Roberts of the Abbott-Detroit team took second honors for the day. The track was very fast, the time good and the largest crowd in the history of the track present. Summaries:

Class C, 161 to 230 cubic inches, sixteen laps, 12 miles—M. Roberts, Abbott-Detroit, won; Meleun, Buick, second; Tune, Abbott-Detroit, third. Time 12:48.

Class C, 301 to 450 cubic inches, twelve laps, 9 miles—Meleun, Marquette-Buick, won; Clark, Cutting, second. Time 8.56⅕.

Class D, mile flying start, free-for-all—De-Hymel, Stoddard-Dayton 50, 0:57; De-Hymel, Stoddard-Dayton 40, 1:02; Roberts, Abbott-Detroit, 1:02⅖; Clark, Cutting, 1:04⅕; Tune, Abbott-Detroit, 1:05; Dunn, Marion, 1:11⅘.

Class B, 300 cubic inches and under, twelve laps, 9 miles—Roberts, Abbott-Detroit, won; Clark, Cutting, second; Tune, Abbott-Detroit, third. Time 9:43.

Free-for-all, forty laps, 30 miles—De-Hymel, Stoddard-Dayton, won, Meleun, Marquette-Buick, second; Clark, Cutting, third. Time, 31:14.

Class C, 231 to 300 inches, twelve laps, 9 miles—De-Hymel, Stoddard-Dayton 40, won; Clark, Cutting, second. Time 9:54. The second car's time was 9:54⅘.

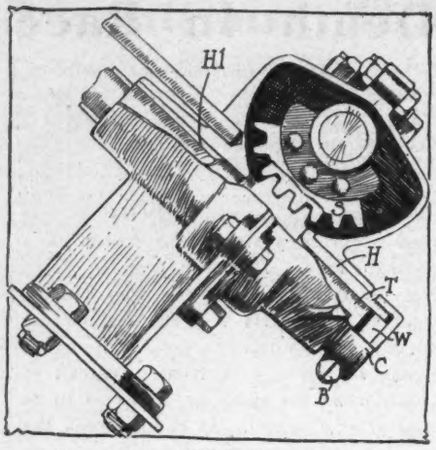


FIG. 1—THE E-M-F STEERING GEAR

ADJUSTING STEERING GEAR

STREATOR, ILL.—Editor Motor Age—In Motor Age, issue July 28, page 21, instructions are given for adjusting a steering rod so as to take up the surplus play in same. On my car, which I purchased last spring, I fail to find the lock nut spoken of. Instead I find a brass clamp with a bolt through it, but am at a loss to know how to adjust same. Will Motor Age kindly investigate and see if any change has been made in the late model of the E-M-F, and if so give instructions through these columns as to how to make the adjustment?—W. S.

In Fig. 1 an illustration of the type of steering-gear on your car is given. It is, as you say, fitted with a brass cap C instead of the two nuts referred to in the previous illustration. To adjust this type of steering mechanism, loosen the clamping stud-bolt B and turn up on the cap C until the thrust-washer W is brought into contact with the end of the shaft T; then fasten the stud-bolt B again securely. It hardly is possible that the bushings H and HI are already worn, or that there is lost motion in the gears due to wear of the sector S; but should you be unable to remove the excessive play by means of the adjustment above mentioned, and you are sure that the play exists between the steering-wheel above and the steering-arm below, then it might be well to have the mechanism removed from the chassis, dis-assembled, thoroughly inspected, and all worn parts readjusted or replaced.

RUST IN RADIATORS

Wahpeton, N. D.—Editor Motor Age—What does Motor Age advise to prevent rust in radiators when the car is put away for the winter? I have been told that after the water is drawn off the radiator it is liable to rust to a damaging degree. Is it a good plan to fill the radiator with kerosene?—T. O'B.

If the radiator is thoroughly drained and the room in which the car is located thoroughly warmed for a couple of days, so as to give the radiator a chance to dry out properly, there should be no rusting of its parts. Most radiators are made up almost entirely of copper, lead and brass and these metals are not easily oxidized. To put kerosene in the radiator would ruin the hose connections. It is claimed that, in most radiators, there is an accumulation, or rather a deposit on the walls of the interior portions which protects them from rust.

The Readers'

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

POWER USED BY FAN

Pittsburg, Pa.—Editor Motor Age—Will Motor Age through the Readers' Clearing House kindly answer the following questions:

1—What percentage of power is absorbed or is required to drive the fan on the average 30-horsepower motor?

2—What is the average amount of power absorbed by back pressure in the muffler of the average 30-horsepower motor?—Fred C. Tygard.

1—The power of a motor that a muffler will absorb depends very much upon the design of the muffler and is perhaps not the same for any two makes of mufflers. The amount of back pressure from, or the power absorbed by mufflers, is frequently arrived at by counting the loss in crankshaft revolutions per minute. A motor is tested free and runs at, say 1,200, revolutions per minute, and when the muffler is coupled up and all factors equal the speed drops to 1,150 revolutions per minute, so the muffler has caused the loss of fifty revolutions per minute. In the diagrams and tables shown herewith some curves and data on fans and mufflers are given showing the results of investigations conducted in the extensive laboratory of the Thomas B. Jeffery Co., in determining the power capacities of the Rambler cars, which are equipped with a 45-horsepower motor. In Fig. 2 is shown the percentage of power absorbed or required to drive the fan. The power curves in this diagram were made with a separately-excited motor and the power required to turn the fan at the various speeds was indicated by the volt and ampere meters, no field losses being considered. This does not include belt friction, but does include bearing friction. The curve marked power is that energy required to turn the fan in still air at the various speeds. The curve marked

POWER CONSUMPTION TEST OF RAMBLER COOLING FAN

Car Speed M. P. H.	—R. P. M.— Engine	Fan	Power Watts	Corrected Power Curve— R. P. M. Correction	Net R. P. M.	Watts	H. P.
5	162	324	5	40	284	40	.00536
10	324	648	9	81	567	80	.0107
15	486	972	28	130	842	17.5	.0235
20	648	1,296	68	178	1,122	43.0	.0576
25	810	1,620	133	215	1,405	87.5	.117
30	972	1,944	224	270	1,674	146.0	.195

Fan run by separately excited motor.

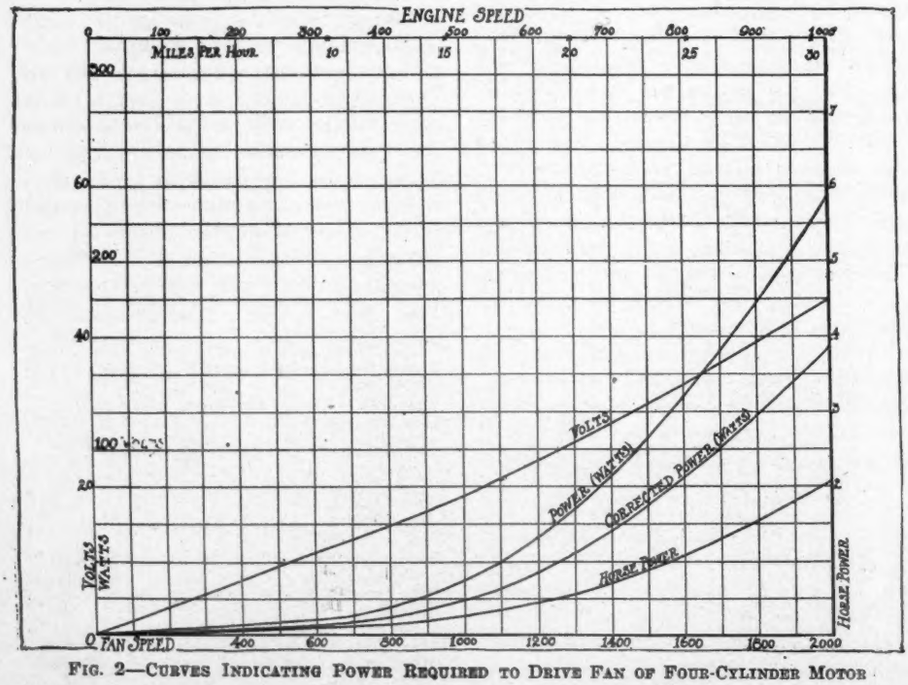


FIG. 2—CURVES INDICATING POWER REQUIRED TO DRIVE FAN OF FOUR-CYLINDER MOTOR

Clearing House

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

corrected power is that power required to turn the fan when it is in motion on the car, there being a difference because the movement of the air through the radiator and against the fan blades, tends to turn the fan in the same direction, so that the power required is considerably reduced.

2—In Fig. 3, a diagram showing the power absorbed by the muffler is reproduced. The data on the mufflers has been recently checked up and claimed to be reliable as far as Rambler mufflers are concerned; it will be noted that only at the very highest speeds does the muffler call for any effort on the part of the engine. Owing to the misuse of the cutout by many motor car drivers, there are now movements on foot in many cities to pass ordinances prohibiting the use of the muffler cut-out; and in order to meet these conditions manufacturers have striven to increase the efficiency of the muffler to such an extent that the cut-out is unnecessary. The use of the muffler cut-out as a warning signal, though generally most effective, is exceedingly harsh and annoying to the majority of persons in the immediate vicinity of a car whose driver is employing it for this purpose by opening the cut-out, releasing the clutch and racing the engine. Not only is the noise disagreeable to the public, but the practice of racing the motor to produce it is equally harmful to the motor.

CHANGING VALVE-LIFTERS

Poughkeepsie, N. Y.—Editor Motor Age—I have read with much interest the article in Motor Age, issue October 13, page 36, on how to take up wear on valve-lifters. Will Motor Age kindly tell me if I can purchase an adjustable valve-lifter, such as supplied on the Inter-State cars, that may be installed on an E-M-F 30?—L. P. Gillespie.

In Fig. 4, for the sake of comparison, the proportional sizes and differences in construction of the Inter-State and E-M-F valve-lifters is shown, and you will readily see from this that it would hardly be practicable to replace the guide G of the E-M-F construction with the much larger one G1 of the Inter-State design. If these guides were of the same size, or nearly so, your suggestion might seem practicable, but under the circumstances it is plain that a change of this nature is out of the question. Perhaps you are not aware that the E-M-F pushrods also have a means of adjustment. At the upper end of the E-M-F pushrod R there is a little fiber insert D. Should the space between the end of the valve stem and the pushrod R, or, rather, the fiber insert D, become excessive, one has but to remove the valve, drill a small hole into the insert D, screw a screw-eye or the like into this hole, then take hold of it with a pair of pliers and draw the insert D out of the end of the pushrod R. This insert then may be replaced with a new one of greater length. These inserts may be obtained readily from the factory, or any of its distributing agencies. It is practical, when about to replace an insert of this kind, to see just about how much longer the new insert should be before the valve is removed. Then dress the new insert down with a file to the proper length before the valve-spring is secured to the valve-stem.

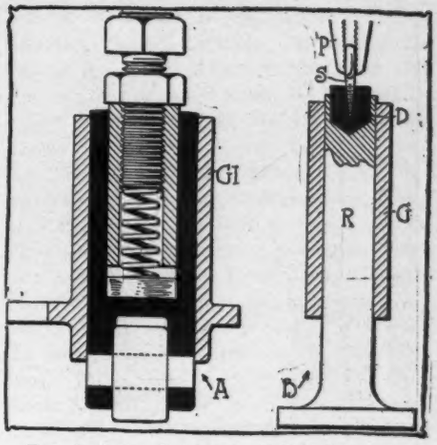


FIG. 4—INTER-STATE AND E-M-F PUSHRODS

THE FOUR-SPEED GEARSET

McGregor, Tex.—Editor Motor Age—Will Motor Age advise me as to what advantages a four-speed forward gearset has over a three-speeds forward set. I am under the impression that the first three speeds on a four-speed transmission are the same as a three-speed transmission and that the fourth is just a faster gearing.—Reader.

A four-speed gearset is invariably used to increase the life of a motor. It is now being recognized that it is better to use different gears than it is to run the motor at crankshafts speeds which are not the most economical. It was argued that when the six-cylinder motor was introduced the four-speed or three speed gearset would not be necessary, but the majority of six-cylinder cars use a four-speed set, and with the choice of four different speeds there is never any abuse given the motor on bad roads. It is rarely that a motor is abused on good roads, but when traveling through continued miles of mud, or through sand, or on hills, the four speeds are very desirable.

MUFFLER TEST DATA FROM THE RAMBLER LABORATORY

Engine R. P. M.	Test No. 724 — Horse Power — Muffler	No Muffler	Loss	Test No. 730 — Horse Power — Muffler	No Muffler	Loss
600	17.6	18.9	1.3	17.4	18.6	1.2
700	20.0	21.5	1.5	19.8	21.2	1.4
800	22.3	24.0	1.7	22.1	23.8	1.7
900	24.3	26.2	1.9	24.3	26.1	1.8
1,000	26.1	28.1	2.0	26.1	28.1	1.9
1,100	27.5	29.7	2.2	27 6	29.7	2.1
1,200	28.6	30.9	2.3	28.6	30.8	2.2
1,300	29.3	31.8	2.5	29.2	31.6	2.4

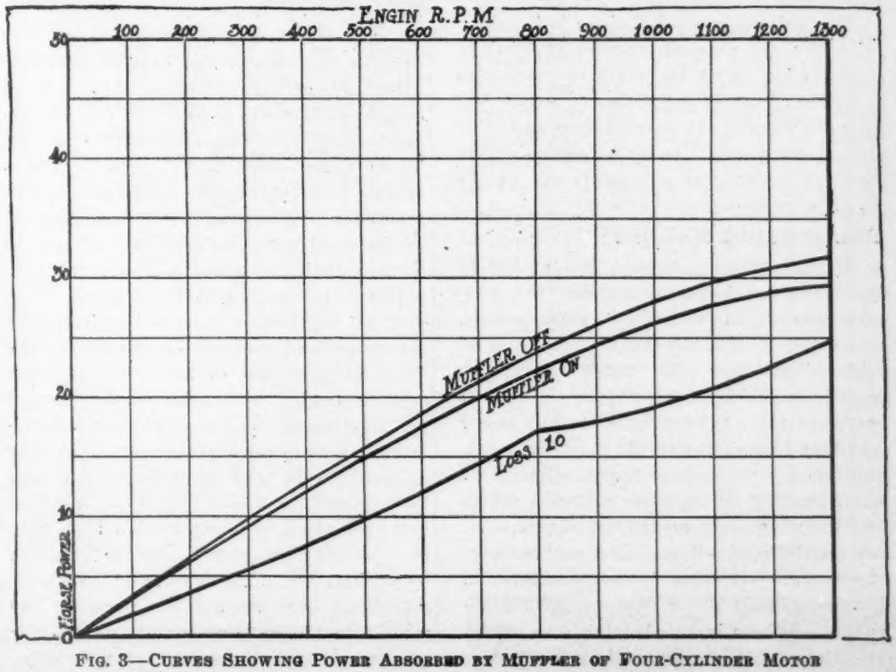


FIG. 3—CURVES SHOWING POWER ABSORBED BY MUFFLER OF FOUR-CYLINDER MOTOR

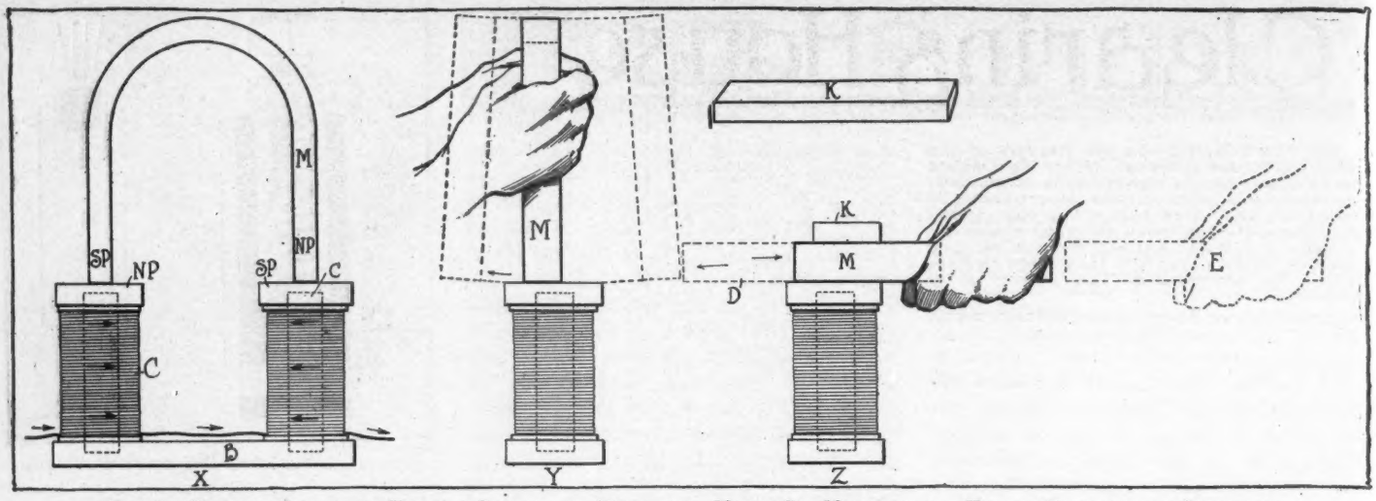


FIG. 5—SHOWING APPARATUS USED TO CHARGE THE MAGNETS OF MOTOR CAR MAGNETOS AND HOW TO PERFORM THE OPERATION

You are scarcely correct in your assumption that the fourth speed is simply a higher speed than direct drive of a three-speed gearset. There are some cars with a four-speed gearset having direct drive on the third, and with the fourth speed a higher gear ratio and intended to drive the car faster than on direct. This design, however, is not customary in four-speed sets. With some manufacturers of six-cylinder cars using the four-speed gearset, the four speeds are not considered a necessity for ordinary work, but are intended for mountain touring. While it is customary in six-cylinder design to have the fourth speed direct, because of the greater motor flexibility, it is on the other hand customary in four-cylinder cars to have the third direct.

FREEZING TEMPERATURES

Ladora, Ia. — Editor Motor Age — Will Motor Age please tell me at what temperature the following mixtures will freeze, if at all? Three gallons water, 2 gallons wood alcohol and 1 gallon glycerine, thoroughly mixed.—H. C. Gates.

Two gallons of alcohol alone in 3 gallons of water will prevent freezing at temperatures as low as 24 degrees below zero, and 1 gallon alone in 3 gallons of water will prevent freezing at temperatures as low as 20 degrees above. So both together should prevent freezing at a temperature as low as at least 35 degrees below zero.

RECHARGING MAGNETS

Grafton, N. D.—Editor Motor Age—I have a Remy magneto on which the magnets are run down, I think, because when the motor is running fast it will work all right, but when the motor is running slowly or pulling on high speed, it will not work at all. I have tried every way I know of to make it work, but cannot succeed, so lay the trouble to the magnets. I am travelling through the state of North Dakota with some travelling men and we are on the road all the time, and without the magneto it takes lots of batteries to keep us going. There does not seem to be anyone out here in this locality who knows anything about a magneto, and so I wish Motor Age would advise us of a method of magnetizing the magneto myself. Many of the small towns have an electric light plant, so I could get plenty of current if needed.—Erwin McLean.

The surest and quickest way of eliminating your trouble is to write the manufacturer of your magneto, state your case, and endeavor to secure another magneto for temporary use. Have this magneto shipped you and when you get it have it installed on the motor; then return your magneto to the manufacturer and let him overhaul it. As regards the charging of the magnets yourself, there are several methods by which the magnets can be successfully remagnetized, but, as both experience and special facilities are required to do this, it hardly would be practicable to attempt the operation without these. The most common method of remagnetizing the magnets of a magneto is by means of a strong electro magnet, such as is illustrated at X in Fig. 5. Almost all magneto agents have a magnet of this sort for the purpose above mentioned. It consists of two soft iron cores, indicated by the dotted outline C, which are about 1 inch or more in diameter and have several hundred turns of No. 18 double cotton-covered copper wire wound around them in the opposite directions indicated by the arrows. These cores have steel or iron plates mounted on their upper ends and the bottom ends are secured to a base plate B of the same soft iron material. It will be noticed that the wires are wound in opposite directions, so that the current will flow in opposite directions and establish the respective polarity of the two poles. With an apparatus of this sort a magnet can be readily remagnetized in perhaps less than a minute, when properly manipulated. Where considerable remagnetizing of magnets is done an apparatus of this kind is quite practical, but where a job of this kind rarely comes to hand it is claimed that satisfactory results may be obtained by winding 100 turns or more of the above-mentioned wire around the poles of the magnet in the same manner in which they are wound around the cores of the device above described, and an electric current then passed through the wires. There are little kinks, however, in the manipulation of a magnet, that are very essential to the success of the operation of remagnetization.

The operations of remagnetizing a magnet by the use of an electro-magnet are shown in detail in Fig. 5. In the first place the north pole NP of a magnet, Fig. X, always should be set in contact with the south pole of the electro-magnet, while the south pole of the magnet to be magnetized should be placed in contact with the north pole of the magnetizing magnet. Opposite poles attract each other, while similar poles repel, and the polarity of a magnet always can be found by holding the magnet near or over the poles of the electro-magnet. If, for instance, the south pole, SP, of the magnet M be held between the north and south poles of the electro-magnet, it will immediately be drawn to the north pole NP, and if the north pole of the magnet M were to be held between the two poles of the electro-magnet it would be drawn towards the south pole SP; thus the polarity of a magnet may be ascertained. If a magnet to be remagnetized were to be placed on an electro-magnet with like poles in contact, the polarity of the magnet would be changed and its magnetism greatly weakened. The polarity of a magneto-magnet should not be changed and care always should be taken in removing magnets from a magneto to see that the poles are marked properly in order that they may be correctly replaced. Now, as for the operation or manipulation of a magneto magnet to remagnetize it, assuming that the current is passing through the wires of the electro-magnet and the polarity of both the magneto-magnet and the electro-magnet is known, set the magneto-magnet M on to the electro-magnet, as shown at X, with the opposite poles in contact, then take hold of it, as indicated at Y, and brush it back and forth over the pole pieces of the electro-magnet, as indicated by the dotted lines. After being brushed back and forth from five to twenty times, lay the magnet

on its side with the bend close to the electro-magnet and the ends protruding out in front of the pole pieces, as indicated by the dotted outline D. Then draw the magnet backward until the ends are half way across the pole pieces of the electro-magnet, rock the magnet up onto the pole pieces into the position shown at Y, and swing it right over until the bend portion is on the side indicated by the dotted lines D. This will bring the opposite edges of the magnet M in contact with the pole pieces of the electro-magnet. The magnet then should be rubbed back and forth once or twice with the magnet in this position so that this portion can be thoroughly saturated, and then rocked back into the position Y and over into the position indicated at Z again. By this time the magnet should be thoroughly remagnetized, so all that remains to be done is to leave it rest in this position for a few minutes, put a keeper K across the opposite edges, as indicated at Z, then pull the magnet or, rather, slide it off and away from the poles of the electro-magnet, as indicated by the dotted outline E. The keeper K is not shown in this dotted outline, but it should be in place until the magnet is in contact with the pole piece, which constitutes the base of the magneto from which it was taken.

Another method of remagnetizing a magneto is by making what is known as a helix, consisting of several hundred turns of wire of the same character used in the electro-magnet, and then passing it from end to end around the bend of the magnet to be magnetized, as indicated in Fig. 6. If a current of electricity of not less than 6 amperes be passed through a helix of about 200 turns, and this helix drawn over the magnet to be remagnetized several times, back and forth, from end to end, the horseshoe will become powerfully remagnetized. The manipulation of this means of remagnetizing a magnet is quite clearly shown in Fig. 6. The operator will bear in mind that that end of the magnet will become north which is under the wire or wires carrying the positive current, the north pole being found to the left hand of this entering current. The arrows at the end of the wires leading to and from the coil or helix indicate the flow of current. If, as indicated in this illustration, the winding of the coil or helix C was such that the current would be circulating around the pole of the magnet in a clockwise direction, when looking directly at the end of the magnet, that pole would become positive. Now, when the coil is passed around the bend of the magnet to the opposite pole the windings would be in an opposite direction, and the negative polarity obtained on this pole.

As one passes the coil C back and forth from end to end, with the current passing through it, it is advisable to tap the steel magnet repeatedly; and if the circuit between the battery or source of current and the helix of wire be frequently broken, the result would be even more satisfactory. Of course it must be understood that a 110-volt electric light current can be more satisfactorily employed than the 6-volt current of the battery.

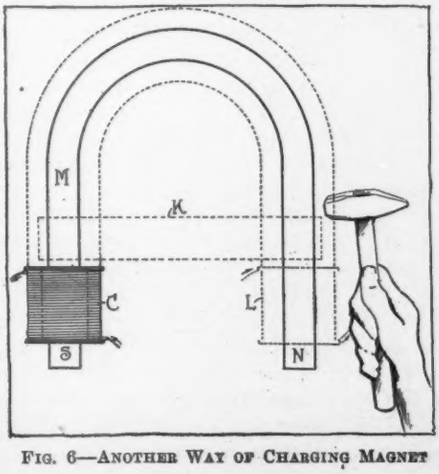


FIG. 6—ANOTHER WAY OF CHARGING MAGNET

FOR BENEFIT OF X

Chicago—Editor Motor Age—For the benefit of X of Crawfordsville, Ind., I wish to state that the Hazard unit motor power plant, manufactured by the Hazard Motor Mfg. Co., Rochester, N. Y., has been installed on a White steamer with success and has been found practicable.—A Reader.

OFFERS SUGGESTIONS

Big Timber, Mont.—Editor Motor Age—Perhaps the following suggestion may be useful to some of your readers: To tighten wheels and spokes remove the hub flange, fill the space between the hub and base of the spokes with melted lead; when cool caulk and pour in enough more lead to fill up, so that the flange will touch it. If the space between the hub and the spokes is not at least 3/16-inch, remove the hub and cut out the base of the spokes. I had trouble with my wheels rattling, but after following the above suggestion I was able to run my car 6,000 miles without any trouble.—Henry Coit.

ST. PAUL TO LOS ANGELES

St. Paul, Minn.—Editor Motor Age—I am planning to motor from this city to Los Angeles, desiring to go via Omaha, Denver, and the best possible route from there. All the information Motor Age can give me of any particular necessities on account of desert sand, etc., will be thankfully received.—F. W. Ramaley.

From St. Paul to Omaha, follow the route as given by the Official Automobile Blue Book, which is through Westcott, Rosemont, Farmington, Northfield, Faribault, Owatonna, Geneva, Albert Lea, Glenville, Northwood, Kensett, Manly, Mason City, Sheffield, Hampton, Iowa Falls, Eldora, Gifford, Liscomb, Albron, Marshalltown, State Center, Colo., Ames, Boone, Ogden, Beaver, Grand Junction, Jefferson, Scranton, Glidden, Carroll, West Side, Vail, Denison, Dow City, Dunlap, Woodbine, Logan, Missouri Valley, Crescent, Council Bluffs, Omaha. From Omaha to Denver, follow the route as covered by the Glidden tourists in 1909, which passes through Elkhorn, Waterloo, Fremont, Ames, North Bend, Rogers, Schuyler, Benton, Columbus, Duncan, Silver Creek, Central City, Grand Island, Shelton, Buda, Kearney, Elm Creek, Lexington, Cozad, North Platte, Ogallala, Julesburg, Sedgwick, Proctor, Sterling, Merino, Brush, Fort Morgan, Bennett, Watkins, Sable, Denver. From Denver to San Francisco, the route covered by the Regal Plugger in 1909 is through Cheyenne, Wyo., Laramie, Rock Creek, Fort Steele, Rawlins, Bitter Creek, Granger, Evanston; Ogden, Utah, Brigham City, Corrinne, Kelton, Lucin; Wells, Nev., Elko, Battle Mountain, Lovelock, Reno, Truckee, Summit, Colfax, Sacramento, Stockton, San Francisco, Salinas, San Miguel, Santa Barbara, Los Angeles. Information and hints on transcontinental touring will be found in the western edition of the Official Blue Book.

FINDS A BETTER WAY

Brookville, Ind.—Editor Motor Age—In Motor Age, issue October 13, page 25, appeared a route from Ironton to Chattanooga in which it was recommended to travel via Cincinnati and from Cincinnati across to Covington on to Lexington. I live near Cincinnati and am a member of the Cincinnati Automobile Club, and the club probably would give a motorist the same advice, but having recently gone over that route from Cincinnati to Louisville I can certainly recommend a different route from Ironton, as the road from Covington to Georgetown is a very poor road, and from Covington to Williamstown it has about a dozen toll gates and more than twenty bad grade railroad crossings. If I were going to make the trip from Wellston or Ironton I would go south to the Ohio river at Ironton or Portsmouth and endeavor to get to Maysville the best possible route. At Maysville you will strike the southern wing of the old national road, and from Maysville to Lexington it is one of the best roads in the country, and it is fairly good road from Lexington to Louisville—better than the average road. About 5 miles east of Lexington is the famous James B. Haggin's stock farm, and it would be worth a motorist's time to stop and see the new dairy plant. It is one of the finest in the world, also one of the finest estates—6,000 acres—there is in the Blue Grass region. I also would recommend that while at Lexington a drive be made to the Henry Clay estate. The people that live there are relatives of Henry Clay and take considerable pride in showing visitors around the house and stable. There is a very fine road from Lexington through Nicholsville to High Bridge, Ky., where one can get a grand view of the Kentucky river gorge, one of the finest views on this continent, and it would not consume more than half a day's time and through a beautiful country.—W. D. Bradt.

From the Four Winds

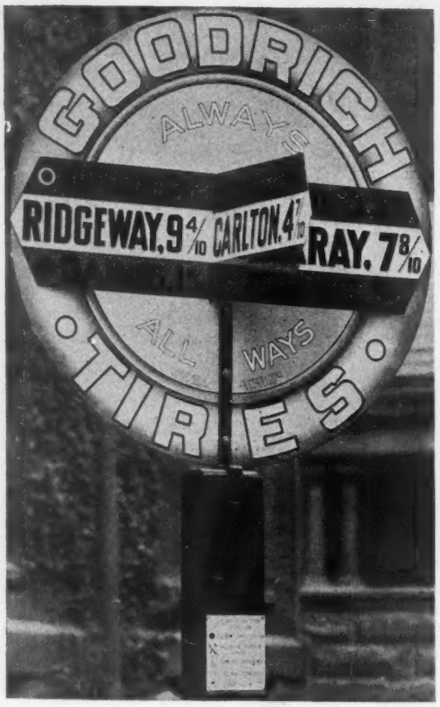
WASHINGTON'S Strength—I. M. Howell, secretary of the state of Washington, states there are now upwards of 5,000 owners in the Evergreen state.

Tentative Dates Chosen—The date for the St. Louis show has been tentatively set by the committee in charge as February 13, making it begin the week following the Chicago show. No definite action has yet been taken in the matter, however, although the committee will hold a meeting in the near future to arrange details and take formal action. There is still considerable agitation for a 2 weeks' exhibit, and this point will have to be settled.

Another Blow for Horse—Superintendent Herman Gampers, of the Columbus, O., municipal light plant, has recommended that five motor cars be purchased for the use of the department, doing away with horse-drawn wagons. Superintendent Gampers claims that at present ten horses are maintained at a large expense. He wants four of the cars for the trimmers and one for the trouble man. He says electrical cars which could be charged at the plant would be the most economical.

Syracuse Club's Growth—The Automobile Club of Syracuse, N. Y., is improving its new quarters in the new Onondaga hotel. New mahogany furniture is being put in. Figures have been compiled which show 1,800 tourists called at the offices of the Syracuse club during the season just ended, making an average of twenty-five per day. The membership is now well above 600 and fifteen names are now on the waiting list. The influx of tourists at the Syracuse club is explained by the fact that Syracuse is on the direct and favorite line of state highways affected by the drivers of motor cars.

Milwaukee Aroused—As the result of an accident which resulted in one death and probably fatal injury to another, the Milwaukee police department is engaged in a vigorous warfare on speeders. The Milwaukee Automobile Club also has started another campaign for strict observance of all laws relating to motor cars, not only among members, but throughout the fraternity. The socialist administration of Milwaukee has already proposed all kinds of stringent legislation, much of which must be declared unconstitutional, if passed, because of interference with the state laws. One ordinance introduced is to reduce the speed limit to 8 miles an hour in the city. The state law allows 12 miles per hour. It is also proposed to drop all fines for speeding and substitute jail sentences. The courts are fining all speeders the limit, $25 and costs, regardless of whether it is first or more numerous offense. The judges are asking for a law to allow them to send violators to jail. There were thirty-one convictions during October in Milwaukee.



GOODRICH ROAD-MARKER

Would Be Double Tax—The common council at Racine, Wis., has decided to drop the proposed ordinance licensing all operators of motor vehicles and providing for a fee of $1 for a license. It has been found that the ordinance would conflict with the state laws and constitute a double tax. An ordinance is now being prepared to prohibit any person under 16 years of age to operate a motor-propelled vehicle. All operators will be supplied with a badge after an examination as to their qualifications, but no fee will be charged.

Truck Demonstration—Fred Robbins, Boston agent for the Atterbury truck, gave a demonstration of the power of these trucks a few days ago in Boston, that was very convincing to those who were watching it. He had one of the 30-horsepower trucks hooked on to one of the big coal wagons of the Metropolitan Coal Co. on Court street, and it was started up the Pemberton square hill, one of the hardest climbs in the city because it is so sharp and steep that it necessitates keeping an extra pair of horses there to help pull loads up. The truck pulled the load along so that the horses had to keep on the jump, the traces never getting a chance to tighten. The coal weighed 9,250 pounds, the coal wagon 4,700, the Atterbury truck 4,000, drivers and helpers 672, a total of 18,622 pounds or 9 tons. A second load 800 pounds less was pulled up on the second gear.

More Members for Bisons—At a recent meeting of the membership committee of the Automobile Club of Buffalo, 127 applications were favorably received. This number brings the total membership of the organization up to 2,408 and continues to sustain the reputation of the Automobile Club of Buffalo as being the largest individual motoring organization in the world.

Convicts Do Good Work—A report of the county road commissioners of Kalamazoo county, Mich., shows that the plan of working every able-bodied convict in the county on new roads has proven very satisfactory during the past year. The farmers and motorists are delighted with the work that has been accomplished. In addition to improving the roads, it is shown that there has been a decrease in crime in the county since the prisoners have been compelled to work on the roads.

Speare Helps Form Club—With Former Governor Floyd and President L. R. Speare, of the A. A. A., as guests, the Cheshire County Automobile Club was formed at Keene, N. H. There was an enthusiastic meeting at which the two prominent guests advocated organization locally, state and nationally, in order that good roads and remedial legislation might be secured for motorists. The club was then organized with the following officers: Dr. Ira J. Prouty, president; R. E. Faulkner, vice-president; F. J. Bennett, treasurer, and F. A. Wright, secretary. It was voted to join the state organization now being formed. The officers expect to get a large number of members throughout the county.

Seattle Club Helping—Affiliation with the Pacific Highway Association, the appointment of a committee to formulate definite plans for advancing the good roads campaign in the state of Washington this winter, the election of officers for the ensuing year, and the decision reached to buy or build a club house next year—these were the important features of the annual meeting of the Automobile Club of Seattle at their meeting last week. Though the plans for the good roads campaign of the club have not been outlined yet, it is known that these will be formed around the central idea of obtaining influence that will make possible the acquisition of the state laws to assist the work, and particularly the passage of an appropriation for more state roads. The officers elected were: A. Warren Gould, president; O. B. Williams treasurer; Charles E. Plimpton, vice-president, and Frank M. Fretwell secretary.

These officers, together with James H. De Veuve, will serve as the board of directors. Clarence Hanford, the retiring president, states that the club membership has been increased 164 since July 1.

Portland Will Not Hold Show—At a recent meeting of the Portland Automobile Dealers' Association, of Portland, Ore., it was decided not to hold a show this year. This was decided on principally on account of not having an auditorium or other suitable place to hold the show. Previous shows have been held in the armory, but this has proved too small on account of the large number of car concerns in Portland. The Commercial Club of Portland expects to build a large convention hall or auditorium the coming year, and it is very likely the 1911 show will be held there.

Another Maxwell Stunt—C. G. Bleasdale, Cleveland Maxwell manager, started at 7 o'clock Saturday morning a model 1, driven by Frank Santry, on a century-a-day run for 10 days. The car will cover 1,000 miles of worst roads in northern Ohio in the interest of good roads and to show the reliability of the car. M. M. Maxwell, secretary of the Cleveland Automobile Club, travels with the car as observer, and carries with him letters on the subject of better roads to editors of each of the leading papers in the larger towns. Maxwell expects to gather much information that will be useful in conducting a campaign for better roads.

Club at Naperville—The Naperville Motor Club has been organized at Naperville, Ill., with a membership of sixty-two. Its objects are to promote the interests of owners of motor vehicles; encourage road improvement; erect guide boards; aid in enforcement of motor laws; provide social functions and parades; and encourage the use of motor cars. Officers elected: President, Judge John S. Goodwin; vice-president, Alvin Scott; treasurer, V. A. Dieter; secretary, C. H. Tobias. Resolutions were adopted instructing the directors to plan for the erection of guide boards on the main roads around Naperville; urging the cutting down of the dangerous S hill east of Naperville on the Chicago road and pledging financial support for that work; urging the road commissioners to use a steam roller in repairing highways, and approving a reasonable wheel tax which it is proposed to lay in Naperville.

Hall Hard to Find—The show committee of the Columbus Automobile Club is busy in its efforts to secure a suitable hall for the purpose of giving the coming show. Considerable difficulty is encountered in the work of securing a hall in Columbus, O., which is sufficiently large.

Dealers Will Give Show—An agreement has just been reached between the Automobile Club of Cincinnati and the Cincinnati Automobile Dealers' Association, by which the dealers' association is to give the annual show with the hearty moral support of the club. The show committee, which is now making a canvass of the situation, expects to arrange dates for the latter part of February or the first part of March.

Mayor Inspects Road—Mayor Martin Behrman and the members of the New Orleans city council last week inspected the new Chef Menteur road, which has been completed two-thirds of its 18 miles by convict labor donated by the state, and by money subscribed by the Motor League of Louisiana, together with an appropriation from the city. The road is in excellent shape. The party was taken along the road by Motor League members.

Milwaukee Getting Strenuous—An ordinance has been introduced in the Milwaukee common council increasing the penalty for exceeding the speed limit. It is a Social-Democratic creation. For the first offense a fine of not less than $100 is provided. The present minimum is $10 and maximum $25. The second offense shall draw a penalty of 3 months in the house of correction, and the third offense 1 year in the house of correction. The speed limit is to remain at 12 miles an hour. It is believed that the ordinance, if passed, would be declared unconstitutional, as there is no alternative of a fine in the case of second or third offense, and the alternative is a requirement of the state laws. A Republican alderman has introduced an ordinance providing a penalty of from $5 to $15 or 60 days' imprisonment for failure to stop when injuring or otherwise running down persons.

Start Good Roads Club—The Good Roads Club of Trout Lake, at the base of Mount Adams, Wash., was last week started out with a membership of fifty. A. J. Johnson is president, F. M. Coate, vice-president, and William Coate, secretary. Every effort is to be made to improve the roads preparatory to next summer's rush of tourists and land seekers in this locality.

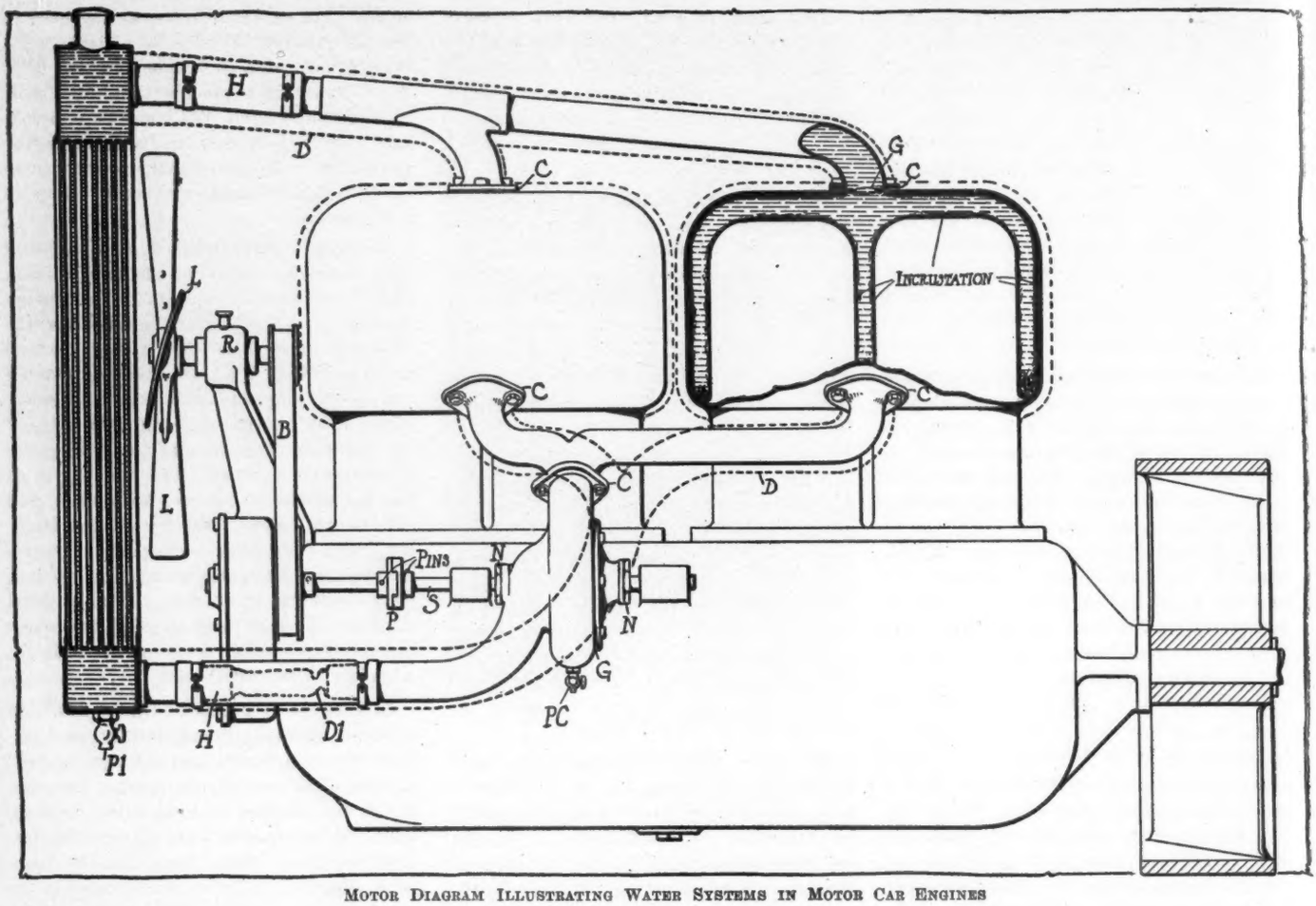
Booming a New Road—P. C. Avery and Emil Schandein, directors of the Wisconsin State Automobile Association, last week started the educational campaign for the lake-to-river road between Milwaukee and LaCrosse, Wis. They are mapping out the trans-state highway and sounding sentiment. Two routes are being laid out and the selection depends upon the willingness of residents to assist. The road starts at the end of Grand avenue, Milwaukee, and goes through Pewaukee, Watertown, Madison, Sauk City, Richland Center, Viroqua, Cashton and St. Joseph to LaCrosse, or a more southerly route may be taken from Westby. At each town an effort was made to interest citizens. Later good roads literature will be distributed.

Of Interest to Tourists—Notice has been received by the Automobile Club of Syracuse that the ferry from Cayuga to Seneca Falls has been discontinued. The road across the marshes at Free Bridge will be kept open and passable through the winter. Tourists going west from Auburn have been directed to follow the macadam on Clark street to Free Bridge, cross the marshes and take the second left turn into Seneca Falls. Going east through Seneca Falls, they are to turn left into Cayuga street and take the right fork to Free Bridge. The new state road from Chittenango Four Corners is at last open to the public, also the new state road from Syracuse to Camillus. This affords a continuous stretch of state road, in splendid condition, almost all the way from Chittenango to Utica.

Means Business—When the Massachusetts highway commission gave out its weekly report recently motorists who follow its deliberations on hearings were given something to think over when they saw that seven licenses had been revoked and four suspended as a result of its hearings and investigations. Ordinarily the suspensions outnumber the revocations and naturally motorists became interested in looking over the weekly list that had cost seven people the right to operate motor cars in the Bay State. The revocations were for taking a car without an owner's permission; overspeeding; operating while under the influence of liquor; and driving improperly. The suspensions were for operating carelessly, resulting in accidents.

GOODRICH COMPANY'S OUTFIT ENGAGED IN POSTING ROAD-MARKERS

The Motor Car Repair Shop



MOTOR DIAGRAM ILLUSTRATING WATER SYSTEMS IN MOTOR CAR ENGINES

THERE are two systems employed in water-cooling the cylinders of gasoline motorcar motors. These are named after the means of water circulation in the respective systems. The thermo-syphon or gravity system is the one in which the water circulation is brought about when the water which is heated in the cylinder jackets rises, and that which is cooled in the radiator descends, it being a law of physics that water when heated becomes lighter in weight, and as it cools its weight increases. The other type of cooling is the one in which a pump is used.

Assuming that the design and the construction of the engine, including all features of the cooling system, are correct, then, outside of leaks, insufficient water and bursting of the waterjackets from freezing, overheating is the final result of all troubles from the cooling system; and overheating is due to either or all of three secondary troubles which may in turn originate from a number of primary causes. The three secondary causes of overheating are impediments to either: First, the circulation of the water through the system; second, the conductivity of the heat through the walls of the cylinders or radiator tubes; third, or the passage of air through the radiator and around the cylinders. A list of the primary causes from which the above mentioned troubles derive their origin are as follows:

CAUSES OF OVERHEATING COMMON TO BOTH SYSTEMS

Insufficient water supply in radiator.
Constricted holes in gasket G of connections C.
Frayed hose connections H, as at D1.
Incrustations or lime deposits on walls of cylinders or radiator tubes.
Mud between fins or cells of radiator.

OVERHEATING CAUSES IN FORCED CIRCULATING SYSTEMS

Broken fan belt B.
Fan belt too loose.
Tight fan belt bearing R.
Improperly bent fan blades L.
Broken pumpshaft S.
Lost pin from pumpshaft coupling P.
Lost pin from pumpshaft gear.
Lost pin from internal pump mechanism.

In addition to these, overheating troubles have occurred in cases where number plates have been attached to the front of radiators so that they cut down their cooling efficiency; and there are cases where the mud pan was so closely fitted that passage of air through the radiator and around the cylinders was restricted so that overheating occurred; troubles of this sort are difficult to locate.

Caustic soda is one of the most commonly used scale solvents, and the water circulating system may be cleared of impurities by filling up the radiator or system with a strong solution of regular washing soda and then running the engine for a few minutes, after which the soda solution should be drawn off and the radiator or cooling system washed out with clear water. The scale which forms in a waterjacket or radiator is generally due to the presence of salts in the water, carbonates and sulphates of lime for the most part which are precipitated when the water is heated; therefore, in order to fully determine the kind and quantity of the preparation to be used for the above purpose, it is necessary to have chemical analysis of the water generally used in the radiator. Almost any of the boiler compounds on the market, obtainable from any of the engineering supply houses, may be conveniently used for cleaning the scale or deposits of lime from a radiator. If you prefer to make your own compounds, dissolve 2 pounds of crystals of soda in each gallon of water contained in your cooling system. Put it in the radiator, run the motor for a few seconds, so that the solution is well distributed throughout the system, let it stand over night, and flush with clear water.

Current Motor Car Patents

NEW Friction Transmission—No. 972,391, dated October 11; to Frederick Messinger, New York—This patent relates to a new design of friction transmission adaptable to motor car service, whose features are illustrated in Fig. 1. In operation the power from the engine is transmitted to the square shaft upon which the friction wheel W is mounted, so, that when the nut N is turned so that it forces the disk D against the wheel W, frictional contact is made and the disk D revolves, communicating the power to the driveshaft DS1. By means of the idler disk D2 and friction wheels DW a similar turning motion is communicated through the disk D1 to the shaft DS. By varying the position of the disk wheel W, by means of the control rod or lever I, the various forward and reverse speeds may be obtained. As illustrated, it is set for extreme low speed; for higher speeds it is made to slide inward toward the center; while for reverse speed it is made to slide inward past the center to the opposite end of the square shaft from that which it now occupies.

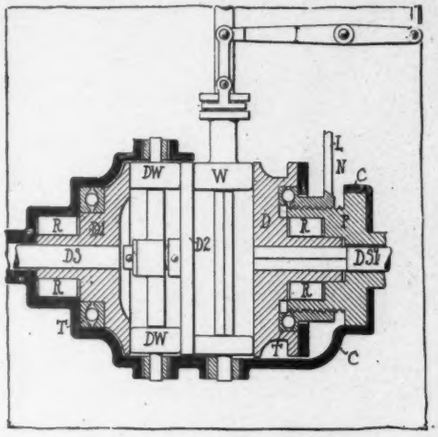


FIG. 1—FRICTION TRANSMISSION

Safety Cranking Mechanism—No. 974,235, dated November 1; to James B. Castle, San Francisco, Cal.—This patent applies to a means adapted for attachment to the starting mechanism of a motor car for the purpose of eliminating the danger of injury to the operator in case a back-kick should occur. As illustrated in Fig. 2, it comprises a casing for attachment to a motor car, a crankingshaft extended therein having a clutch member for engagement with the clutch member of an engineshaft, and an automatically releasing connection between the starting crank and the intermediate shaft between it and the engineshaft. There is a head rotatable within the casing through which the crankingshaft is slidable, and a hub into which the projecting end of this shaft extends; a disk is carried by the hub which has a dog pivoted to it for engagement with the head of the crankingshaft, and a pawl is pivoted to the head of the dog for engagement with a ring rack secured to the casing. Should a back explosion occur, the action of the pawl, in connection with the ratchet or rack ring, would disengage the dog from the head of the crankingshaft, thereby permitting the crankingshaft to revolve in a reverse direction with the crankshaft of the motor, without jerking the starting crank around with it.

Another Starting Mechanism—No. 974,525, dated November 1, has been invented by John B. Runner, Indianapolis, Ind.—It is a device operating in a similar manner to the mechanism above described, and for the same purpose, but it differs in design and construction.

Clutch and Brake-Operating Mechanism, No. 974,649, dated November 1; to Skottowe B. Fishburne and Israel H. Bond, Columbia, S. C.—This patent relates to a means of connecting the brake-operating mechanism, to the clutch-operating mechanism of a car having a planetary gearset, so that when the brake, which is operated by a pedal is brought into action, the clutch is first automatically released. It is a device which not only eliminates the tendency on the part of some drivers to apply the brake without first releasing the clutch, but also greatly facilitates control of the car in general. As shown in Fig. 3 it is a very simple contrivance, consisting of a rod R, in two parts, which are adjustably connected by a turnbuckle T, with a hook at one end and a yoke at the opposite end, adapted for attachment with the short arms or dogs on the clutch and brake control rods. In the illustration the forward end of the rod R is attached to the brake-operating shaft S, and the rear end of the rod is hooked into the yoke Y of the clutch operating rod C, so that when the brake rod S is operated by the pedal the rod R is pulled forward, transmitting a similar motion to the rod C which releases the clutch H, without the necessity of operating the handle D.

Headlight Steering Gear, No. 974,579, dated November 1; to Arthur G. Lindley, Schenectady, N. Y.—This patent covers a means of connecting the headlight brackets of a motor car to the steering mechanism so that they may be turned in unison therewith, and facilitates driving around curves in the dark. The arrangement of this device is shown in Fig. 5, and it consists of a pivot post P mounted on a bracket which is secured to the frame or portion of the body which carries the lamps, another pivot post P1 mounted on a bracket attached to the axle or running gear of the car, connecting rods R arranged so as to make the posts P1 and P2 rotate in unison, and a rod R1 communicating between the steering post P1 and the steering knuckle N.

Motor Car Spring Suspension, No. 974,313, dated November 1; to Emory D. Toops, Indianapolis, Ind.—This patent covers a new type of spring suspension which is illustrated in Fig. 4. One regular semi-elliptic spring is secured in the regular manner to the axle A of the vehicle and at one end to the main frame; a second semi-elliptic spring is connected at its middle to the free end of the first spring and at its ends to the main frame, and a third compression spring C is interposed between the middle of the second spring and the main frame.

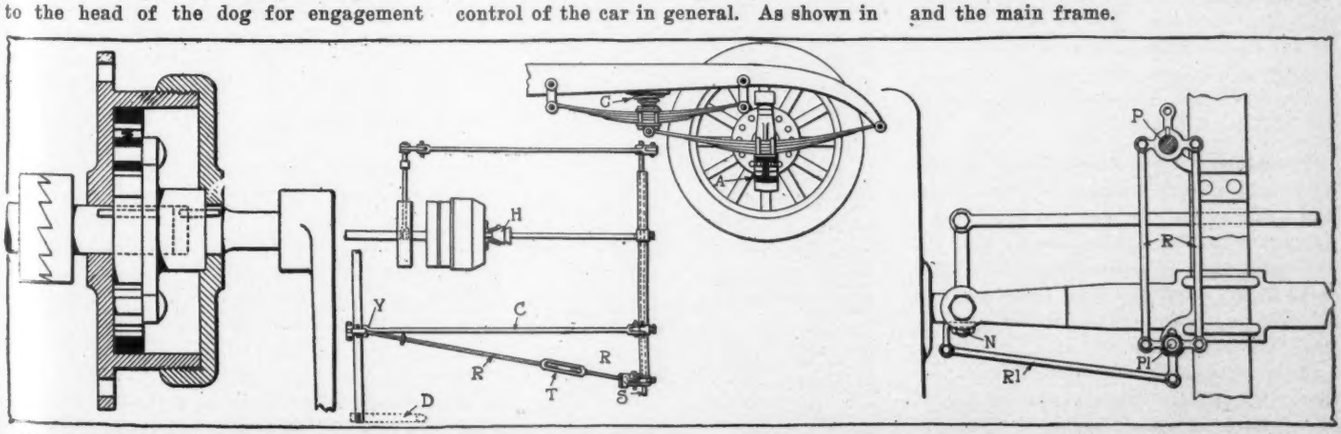


FIG. 2—PREVENTS BACK KICK FIG. 3—BRAKE-CLUTCH CONNECTION FIG. 4—SPRING SUSPENSION FIG. 5—MOVABLE HEADLIGHT

Among the Makers and Dealers

NEW ORLEANS SHOW PROMOTERS AND PARTICIPANTS

Top row, from left to right—Magnass, Schwartz, Hungerford, J. M. Thompson, W. B. Utley, E. E. Clarke. Middle row—Demack, Brown, M. E. Hart, M. B. Trezevant, Mike Hart, Brubear, T. C. Campbell. Bottom row—W. B. Allen, Schallings, A. Aschaffenburg, Myatt, Homer George, Dicks, Barton, Lyons G. Abbott, Wright.

TAXICABS in Northwest—According to recent count there are exactly 123 taxicabs in operation in the northwest, confined to five cities: Seattle, 40; Portland, 24; Spokane, 20; Vancouver, 9; Tacoma, 30.

Discontinues Small Model—The Roader Car Co. of Brockton, Mass., has decided to discontinue the manufacture of its 20-horsepower model. It will put forth all its efforts in the production of its 30-horsepower type.

Jewel Increases Stock—The Jewel Carriage Co. has increased its capital stock from $250,000 to $450,000. The increase will be disposed of as preferred stock in 2,000 shares of $100 each. The holders will draw 6 per cent interest out of the surplus profits.

Premier Agency Change—During the coming season the Premier will be distributed in Indianapolis and Indiana by the newly organized Premier Sales Co., which has established headquarters at 233-235 Massachusetts avenue in Indianapolis. Henry L. Johnson, until recently manager of the Boston Premier branch, has assumed charge as manager. The Premier for many years has been distributed in Indiana by the Gibson Automobile Co.

Philadelphia Show Plans—With an array of exhibitors that presages beyond a doubt the success of Philadelphia's show, active preparations already are under way and the exhibition promises to eclipse all former motor displays. The following cars will be on view the initial week: Autocar, Alco, American, Conner, Chadwick, Cadillac, Chalmers, Columbia, Everitt, Elmore, Hupmobile, Hudson, Knox, Lozier, Locomobile, Marmon, Maxwell, Mitchell, Marion, Mercer, National, Oakland, Overland, Oldsmobile, Peerless, Pierce-Arrow, Pullman, Packard, Premier, Palmer-Singer, Pope-Hartford, Royal Tourist, Reo, Stearns, Selden, Stevens-Duryea, Stoddard-Dayton, Studebaker, Thomas, White and the Winton.

Buys Canadian Tire Plant—The Goodyear Tire and Rubber Co. has purchased the Durham Rubber Co.'s plant at Bowmanville, Ontario, Can., which it is equipping at a cost of $150,000. The purpose is said to be able to manufacture and sell goods in Canada and escape paying a duty of 35 per cent. The company will manufacture mechanical and tire goods, and will be known as the Goodyear Tire and Rubber Co. of Canada, Limited. One hundred men will be employed at the start. The company's offices will be in Toronto.

Taxicab Merger—Taxicab competition is at an end in Spokane, Wash. The Spokane Taxicab Co. and the Taxicab Motor Co. have consolidated. The twenty taxicabs in operation in that city will be operated by the Spokane Taxicab Co., Walter J. Nicholls, president, and G. E. Riegel, manager, with a capital stock increased to $200,000. George W. Merrill, of the Taxicab Motor Co., resigned to handle the Thomas. W. Graves, F. T. McCullough and Lester Edge comprise the directorate of the new company. A new charge for taxicabs will also take effect. There will be no calling or dismissal charge, no extra night charge and no flat rates for certain hauls. Everything will be as scheduled on the tariff sheet, a straight rate of 50 cents for the first ½ mile or fraction and 10 cents for each addition ¼ mile for from one to three persons. Calling and dismissal charges rule in every city in the country outside of Spokane. They consist of a charge of from 20 to 40 cents per mile for the call, and the same rate for dismissal. Then it is customary to add 30 cents to each call between the hours of 1 and 7 o'clock in the morning.

Faurote Makes Change—Announcement is made of the resignation of Fay L. Faurote as advertising manager of the E. R. Thomas Motor Co. Mr. Faurote leaves the Buffalo concern November 30 to become associated with a large corporation having its offices in Chicago.

Likes Motor Business—Rather significant is the action of the R. D. & C. O. Britton Co., Hartford, Conn., agent for the Maxwell and Columbia lines, which has entirely abandoned the sale of horse goods. This house, up to within a short time ago, was one of the largest concerns in the east dealing in horse goods, but the growth of the motor trade has been so rapid that from now on nothing but motor cars and sundries will be featured.

Making the Virginian—The Richmond Iron Works Corporation, an organization founded from a number of smaller iron works concerns many years ago, has now placed on the market the first motor car ever manufactured in Richmond. The car will be known as the Virginian. The officers of the corporation are: M. A. Finn, president; H. H. McCurdy, vice-president; M. J. Francis, treasurer; W. P. Dessaussure, secretary; R. Massie Nolting, assistant secretary and treasurer; W. H. Woody, general manager; H. G. Wagner, sales manager.

Truck Men Organize—At a meeting of a number of dealers connected with the Boston Automobile Dealers' Association who handle commercial vehicles in addition to their line of pleasure cars an organization was formed known as the Boston Motor Truck Association. The organization will start in at once to push the merits of the commercial vehicles, and in the future will have shows, endurance runs and reliability contests of various kinds. Most of the twenty-five dealers who handle commercial vehicles in Boston already have joined and invitations have been sent to the others. The field is increasing largely in New England and the dealers decided it was a good time to form an organization. Officers were chosen as follows: J. W. Maguire, Pierce-Arrow, president; A. P. Underhill, Knox, vice-president; J. S. Hathaway, White, treasurer; Chester I. Campbell, secretary; board of directors, the above officers and A. B. Henley, Franklin; Victor A. Charles, Inter-State, L. B. Butler, Rapid, and C. F. Whitney, Alco and Stoddard-Dayton. The ad-

visability of having a show for commercial vehicles solely this season was discussed, and it was decided that the plans could not be matured sufficiently without interfering with the arrangements for the regular motor show next March.

New Chicago Concern—The Clark Delivery Car Co. has been formed in Chicago for the purpose of manufacturing light delivery trucks. This company was incorporated under the statutes of Illinois with a capitalization of $150,000, Senator A. C. Clark being its president and William C. Smith secretary and treasurer.

Opens New Store—The first show of the current season in Philadelphia was opened last Monday evening, continuing for a week at the Philadelphia headquarters of the Auto Sales Corporation, 142-144 North Broad street. The show marks the completion of the new store and warehouse of the Auto Sales Corporation and the exhibition of a complete line of Peerless and Cadillac cars. Open house has been held all week, the building being handsomely decorated for the occasion with flowers.

New Goodrich Scheme—In order to aid its dealers in a more efficient marketing of its products throughout the country, the B. F. Goodrich Co. has planned the establishment of twenty-seven tire depots in the United States, and is placing a manager or tire adjuster at each one of these stations. For this purpose it has been training a class of twenty-seven young men in the ethics of the rubber business, with special reference to the sale of tires and adjusting claims on tires. The instruction has been completed, and the adjusters, fully instructed in their new duties, have departed for their stations. They were given a banquet by the company at the Portage Country Club Friday night, November 11. The class consists of the following: C. S. Bower, C. A. Fassnacht, D. E. Wilcox, E. Straehl, T. C. Norris, B. A. Thurin, W. B. Aldefer, C. A. Breyley, K. K. Kantzer, D. B. Jarvis, E. E. Rhoades, W. A. Gardner, O. A. Evans, C. E. Lindquist, G. H. Wood, E. H. Schwan, F. A. Schumacher, B. F. Morris, W. S. Rutherford, L. Woodward, J. D. Hotchkiss, N. J. Murray, F. Little, R. Hassler, G. P. Colman and J. M. Dempsey.

STORE OF THE POPE-HARTFORD MOTOR CAR CO. OF ST. LOUIS

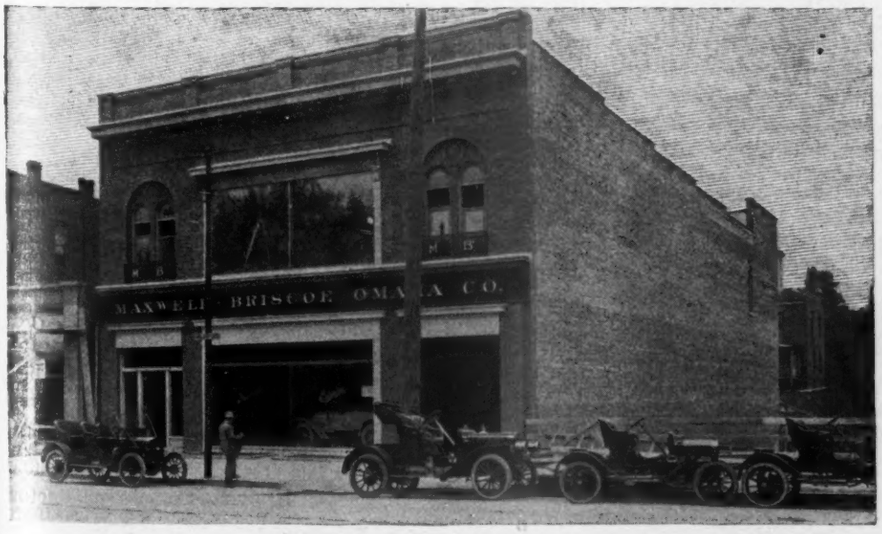
Engineers' Meeting Called—Howard E. Coffin, president of the Society of Automobile Engineers, has announced that the annual meeting of the S. A. E. will be held in New York city on Wednesday and Thursday, January 11 and 12, 1911. The 2 days' sessions will be devoted to the business of the society and to technical subjects upon several of which papers will have been printed and distributed in advance of the meeting.

Making a Test Case—Worth E. Cole, manager of the Worth Auto Sales Co., was in police court in Richmond, Va., charged with conducting a motor car business in that city without a license. The case was brought by Secretary of the Commonwealth B. O. James, and is meant as a test case to determine how licenses shall be required from those in the motor car business. Through his attorney, Mr. Cole claimed that he is not doing a business without license, but that he has a demonstrating car and pays license on it. The cars he sells are sold to all purchasers, f. o. b. Cleveland, O., and therefore no license is required of him in Richmond.

Jeffery Using Electricity—The entire plant of the Thomas B. Jeffery Co. at Kenosha, Wis., is now operated by electric power. The new power plant has been completed and individual motors attached to every machine tool. The old steam power plant has been abandoned. The new plant develops 2,500 horsepower and was installed by the Allis-Chalmers Co. of Milwaukee. The Rambler plant now covers 93 acres, including a ½-mile testing track. There are 550,000 square feet of floor space.

Baltimore Concern in Trouble—The Royal Auto Co., of Baltimore, has been placed in the hands of receivers on the order of Judge Stockbridge, of the circuit court. Attorney Robert A. Mowbray has been appointed to take charge of the assets under the jurisdiction of the court and has given bond in the sum of $1,000. The action was taken on petition filed by Frank L. and Nellie C. Hiser, stockholders. It was stated that the concern has practically suspended business and the court is asked to dissolve it.

Baseball Man a Dealer—John I. Taylor, owner of the Boston American baseball club, has embarked in the motor business with a company known as the Taylor Motor Sales Co., of which he is president. Hugh McBreen, treasurer of the club, also is treasurer of the new company, and A. H. Mitchell, who is well known as a sporting writer, is vice-president. The company has taken on the Herreshoff for a start, but later on will take also a larger car and a commercial vehicle. Salesrooms have been secured at 157 Massachusetts avenue.



HEADQUARTERS OF THE MAXWELL-BRISCOE OMAHA CO.

Brief Business

PORTLAND, ORE.—The E-M-F has opened a permanent factory branch here.

Racine, Wis.—Breitzke & Pauli have taken the agency for the Hupmobile in Racine.

Louisville, Ky.—The Louisville Automobile Co. has taken the agency for the Hupp-Yeats electric.

Tacoma, Wash.—W. O. Sanford of the Tacoma Taxicab Co. has concluded negotiations for handling the Peerless in this city.

Newark, O.—Sigler & Hare, a partnership formed recently, have purchased the garage formerly operated by D. J. Taylor. The firm is agent for the Maxwell.

Louisville, Ky.—James C. Clinton, of Detroit, has been appointed manager of the Louisville branch of the Studebaker. He succeeds Daniel T. Patton, who resigned.

Spokane, Wash.—The Rapid motor truck upkeep garage has been established with the Spokane Oxyacetylene Welding Co. at 11-13 Indiana avenue, with I. Forrest in charge.

Seattle, Wash.—A. C. Gardner is the new distributor for the Reo and Apperson cars in Everett, Wash., while Dr. J. C. House handles the same lines in Port Townsend, Wash.

Toledo, O.—The offices of the Dusseau Fore and Rear Drive Auto Co., of Toledo, have been removed from the Ohio building to the rooms at 233 Erie street, formerly occupied by the Warren Motor Sales Co.

Seattle, Wash.—T. A. Davies and Harry W. Smith have taken the agency for the Lozier car in Seattle. C. S. Cummings, until recently manager of the Metropolitan Motor Car Co., will be associated with them.

Syracuse, N. Y.—The Mitchell has arranged to be represented here by John Youmans, who will have a temporary garage at 512 South Clinton street and is having work rushed on a permanent building at the corner of South State and Cedar streets.

Toledo, O.—W. W. Wallace has purchased an interest in the Ohio Auto and Repair Co., of Machen street. He formerly was connected for several years with the Cadillac. In the future the business will be conducted by Wallace and W. H. Cleveland as a partnership.

Elyria, O.—The Machine Parts Co., chartered several weeks ago, with a capital of $125,000, will locate a plant in the old factory of the Elyria Machine Parts Co. The object of the corporation is to manufacture steering gears and aluminum castings for motor cars.

Portland, Ore.—The Portland-Detroit Auto Co. has been incorporated by H. O. Hickord and J. E. Maxon, Portland, to act as distributors for the Warren-Detroit for the state of Oregon. The company is erecting a two-story brick garage, 50 by 80 feet, with basement, at Fourteenth and Couch streets, which will be ready for occupancy February 1.

Boston, Mass.—The Pennsylvania Rubber Co. has appointed Poet & Lester agent for Boston and vicinity.

Seattle, Wash.—A. G. Shaefer, for some years with the Winton Seattle branch, is now identified with the Packard Seattle agency.

Marshalltown, Ia.—The Marshall Oil Co. has taken possession of its new office building. The building is of pressed brick with stone trimming, two stories in height.

Hartford, Conn.—G. F. Robinson of the New York office of the Packard branch has been assigned to the Hartford office as assistant to Manager Charles E. Embleton.

Oak Park, Ill.—Ground has been broken by Wright Elsom for a modern cement and stone garage, 54 by 110 feet. The building will be occupied by Wright Elsom, Jr., for a general garage business.

Philadelphia, Pa.—Charles M. Strieby has been appointed sales manager of the Olds-Oakland Co., 506-508 North Broad street, with supervision over the wholesale and retail business in Pennsylvania, New Jersey, Delaware, Maryland, Virginia, District of Columbia and North Carolina.

Racine, Wis.—The Wisconsin Auto Top Co. is building two additions to its plant, doubling the capacity and floor space. The company is experimenting with devices to cover radiators and hoods in cold weather.

Cleveland, O.—The Gyro Motor Co. has been incorporated with a capital of $10,000 to manufacture and sell explosive motors of all kinds for motor cars and other purposes, by C. W. Hunt, W. L. Cary, H. R. Palmer, Plym C. Davis and J. W. Cents.

Tacoma, Wash.—The St. Helens garage, which is one of the finest buildings in the state devoted to the industry, has been opened. The new building will house the Winton and the Cadillac, and has just been completed for its owners, G. D. Rushmore and T. W. Little.

Baltimore, Md.—The Winton Motor Car Co. has planned the erection of a new garage on Maryland and Mount Royal avenues. The tentative plans, which may be slightly changed, call for a garage of either brick or concrete construction, with stone trimmings and a slag roof.

Toledo, O.—The Standard Garage Co. of Toledo has been incorporated by R. A. Parker, Jennie Parker, William Searles, M. M. Turner and William G. Clark. It has a capital stock of $5,000. Its garage is located at 233-37 Ontario street and it will take over the business heretofore conducted by R. A. Parker under the name of the Standard garage.

Seattle, Wash.—The Reo and Apperson now are represented in Seattle by Dr. M. A. Miller.

Cincinnati, O.—The Regal will henceforth be represented in Cincinnati by the George C. Miller & Sons Co.

Louisville, Ky.—The Straffer Arterburn Motor Car Co. has moved its offices from 1103 East Broadway to 324 East Market street.

Cleveland, O.—The Mark Motor Car Co. has been appointed the local agency for the Alpena Flyer. The Mark company also is the agent in this territory for the Metz runabout.

Cleveland, O.—Harry S. Moore has removed his Stoddard-Dayton sales department from Euclid avenue and again has his entire business under one roof at 1761 Crawford road.

Syracuse, N. Y.—The Willis Motor Car Co. plans to enlarge its sales organization during the coming year and instead of three will represent seven cars. The Selden and Baker electric, which the Central Auto Sales Co. has previously represented in Syracuse, will be taken over. The Oldsmobile, Oakland pleasure cars and the Rapid and Reliance commercial vehicles comprise the remainder of the line. The new garage is at 628 Montgomery street. This is a three-story build-

Recent Incorporations

New York—Gett Mfg. Co., capital stock $200,000; to manufacture ball bearings, machinery, engines, motor vehicles, etc.; incorporators, L. B. Gleason, F. B. von Teuber and A. G. Schultz.

Watervliet, N. Y.—Victor Appliance Co., capital stock $5,000; to manufacture and sell motor cars, motor boat supplies; incorporators, A. Bigel, G. Garrow and Dewitt Tappan.

Boston, Mass.—Pickard Brothers Motor Car Co., capital stock $150,000; to manufacture motor vehicles; incorporators, E. J. Pickard and B. I. Pickard.

Boston, Mass.—Lenox Motor Car Co., capital stock $75,000; to manufacture motor vehicles; incorporators, A. A. Martell and F. A. McClaskey.

Boston, Mass.—Lowe-Howard Co., capital stock $10,000; to manufacture motor cars; incorporators, George H. Lowe, Frank J. Howard and George E. Tufts.

Boston, Mass.—Kenneth Motor Co., capital stock $20,000; incorporators, W. C. Marsh, W. H. Dietzman.

Boston, Mass.—Rambler Auto Co., capital stock $10,000; incorporators, C. P. Rockwell and Arthur P. Telle.

Philadelphia, Pa.—International Automobile and Engine Co., capital stock $1,000,000; to manufacture airships, motor cycles and motor boats; incorporators, W. D. Yarnall, E. H. James and S. C. Seynour.

Cleveland, O.—West Side Motorcycle Co., capital stock $5,000; incorporators, W. S. Listler and others.

Chicago—R. Adams Brothers Co., capital stock $10,000; to manufacture and deal in motor cars, etc.; incorporators, C. R. Horns, Walter D. Tuff and J. B. Diebler.

St. Louis, Mo.—Washington Automobile Co., capital stock $10,000; incorporators, A. Collier, Adolph Simon, Charles J. Schneider and others.

San Antonio, Texas—Commercial Motor Car Co., capital stock $100,000; incorporators, Z. Z. Brandon, B. A. Gramm and H. O. Skinner.

Announcements

ing. T. F. Willis continues as general manager.

Columbus, O.—The Early Motor Car Co. has taken the central Ohio agency for the Herreshoff.

Washington, Ill.—A. D. Knauvel and J. A. Lorenzen have taken possession of the garage of Myers & Field.

Corvalis, Ore.—Harry Twitchell, distributor for the Cole, has established a subagency for that car with Woods & Holly.

Hartford, Conn.—The F. A. Law Machine Co., one of the first concerns in this city to engage in repairing on a large scale, has just doubled its capacity for repair work.

Baltimore, Md.—The Shaffer Mfg. Co., agent for the Pullman car, has opened its new garage and salesrooms at 408 and 410 North Calvert street.

Bowling Green, O.—The Bowling Green Garage Co. has been incorporated to operate a sales agency and garage at that place by A. E. Royce, R. E. Bates, Robert Place, B. C. Harding and F. R. Rigler. The authorized capital is $10,000.

Madison, Wis.—The DeTamble Motor Car Co. has been organized to distribute DeTamble cars in Wisconsin. J. H. Irwin, until recently Wisconsin representative of the Firestone Tire and Rubber Co., will be the manager. Early next spring the concern will build a $25,000 garage at South Butler and East Wilson streets, Madison, on the site of the building now used for the agency.

Hood River, Ore.—W. F. Slidden, agent for the Maxwell, has added the Columbia to his line.

Seattle, Wash.—Charles H. Burman, western representative of the Peerless Motor Car Co., has decided to locate permanently in Seattle.

Philadelphia, Pa.—Bernard A. Ciesluk, formerly head inspector of the Chadwick Engineering Works, Pottstown, Pa., is now affiliated with the Jordan Machine Co., Philadelphia.

Cincinnati, O.—Harry G. Moore has established a branch of the Velie Motor Car Co., in Race street, in the vicinity of the Goodrich Tire Co., Franklin Automobile Co. and Ford Motor Co. branch.

Meriden, Conn.—Charles Rubel, formerly of the Connecticut ignition department of the United Manufacturers, is now located at the factory of the Connecticut Telephone and Electric Co., Meriden, Conn.

Toledo, O.—The capital stock of the Roy Ramson Auto Livery Co. has been increased from $10,000 to $25,000 by papers filed with the secretary of state recently. Roy Ramson is president and A. L. Beecher, secretary.

Hartford, Conn.—The Firestone Motor Co. has taken the agency for the Firestone-Columbus in this vicinity and has opened an office at 18 Elm street. This car has not been represented in this city previously.

New Orleans, La.—The Cartercar Co. has opened a branch in New Orleans. The company will be known as the Cartercar Sales Co. and is located at 1922-1924 Common street, with Victor Shaw as manager.

Columbus, O.—The Packard Taxicab and Auto Livery Co. has been incorporated with an authorized capital of $30,000 to operate a taxicab and livery service at 33 South Scioto street by Louis M. Gillispie, Garry L. Sitgreaves, Halbert Alexander, N. Hutchinson and G. F. Castle.

Columbus, O.—The United Motor Columbus Co., of which F. P. Corbett is general manager, has closed a number of contracts for sub-agencies for the Maxwell for 1911. The local agency has a total of thirty-six counties in central and southern Ohio and three counties in Kentucky. The three Kentucky counties are handled from Portsmouth and consist of Boyd, Greenup and Lewis counties. Sub-agencies closed are: W. A. Biddle, Urbana, O.; Frank P. Arnold, Cambridge; Sigler & Hare, Newark; O. W. Bonner, Delaware; Harper & Hosier, Jamestown; D. J. Bobson, Cardington, O.; the Ruhlman garage, Portsmouth; Miles Wickens, Dexter City; Bartley & Mallon, Frankfort; W. L. Richards, West Union.

Tacoma, Wash.—The Hupmobile now located in Tacoma at the Independent Auto Machine Co.

Louisville, Ky.—The Yager Motor Car Co. has moved into its new garage and salesroom at 331 South Third avenue.

Columbus, O.—The Robert F. Boda Automobile Co., central Ohio agent for the Mitchell, has closed a sub-agency at Marion with the G. E. Abel Auto Co.

Des Moines, Ia.—The Cartercar agency operated by R. A. Cruzan & Co., will soon be in a greatly enlarged new home. The company has purchased the property at 909-11 Walnut street.

Fremont, O.—M. N. Mudd, of New York, has purchased the Palace garage, located on West State street, Fred Fuller retiring. In addition to the garage business the concern is local agent for the Buick.

Toledo, O.—The Standard Garage Co. has been incorporated with an authorized capital of $20,000 to operate a garage and repair shop and run a taxicab service, by R. A. Parker, J. P. Searles, N. M. Turner, William G. Clark and Harry Ludwig.

Milwaukee, Wis.—Articles of incorporation have been filed in Wisconsin by the Wisconsin Kerosene, Gas Light and Fuel Co., of Milwaukee. The capital stock is $10,000. O. S. Palmer, E. W. Symons and A. B. Myers appear as incorporators.

Cincinnati, O.—Charles W. Simpson has assumed the management of the Diamond Rubber Co.'s local branch office and store at 807 Race street, succeeding E. B. Tozier, who has been appointed manager of the Diamond company's branch at Minneapolis.

Syracuse, N. Y.—The garage of the Central City Motor Car Co., now being built at Taylor and South Salina streets by H. W. Balsley, will be open soon after December 15. The building is 80 by 125 feet and is being equipped for the showing of E-M-F and Haynes cars.

Cleveland, O.—The Cleveland Alpco Light Co. has been organized with headquarters at 6817 Euclid avenue, with D. C. Stewart as manager and treasurer; W. C. Phelps, secretary, and E. Albright, president. The company is the Ohio agent for the Aplco portable storage batteries.

Cleveland, O.—The Horsey Mfg. Co. has been incorporated with a capital of $5,000 to manufacture and sell a patented nocement patch for tire repairing and to make other accessories. The incorporators were E. F. Horsey, W. H. Horsey, C. V. Brown, L. F. Horsey and Bertha M. Schusler.

Richmond, Va.—The state corporation commission has issued a charter to do business in Virginia to the Southern Motor Car Co., of Richmond. The incorporators are: L. M. Lee, president; R. M. Strader, vice-president; R. H. Eastwood, vice-president and treasurer; C. W. Yeamans, general manager, all of Richmond.

Recent Incorporations

Nashville, Tenn.—Hazen Automobile Co., capital stock $25,000; to conduct a motor car mercantile business; incorporators, F. E. Hazen, A. N. Hatton, H. D. Goff, J. M. Goff and H. H. Bonner.

Morristown, Pa.—Modern Auto Supply Co., capital stock $35,000; to manufacture, sell and deal in motor cars and supplies.

Dover, Del.—Automobile Owners' Co-Operative Co., capital stock $100,000; to manufacture, sell and deal in motor cars and repairs for same; incorporators, F. Hendrick, John T. McGovern and C. W. Gormly.

Philadelphia, Pa.—Progressive Motor Sales Co., capital stock $100,000; to manufacture, sell and deal in motor cars.

Boston, Mass.—Columbia Tire and Top Co., capital stock $35,000; motor vehicles; incorporators, F. F. Wentworth and R. A. Brine.

Bangor, Me.—Penobscot Motor Co., capital stock $100,000; to deal in motor cars, motors, engines, etc.; incorporators, F. D. Oliver and J. S. Howe.

Indianapolis, Ind.—Marion Sales Co., capital stock $10,000; to buy and sell motor cars; incorporators, J. E. Kepperly, E. A. Brown and J. O. Vanier.

Indianapolis, Ind.—Kokomo Inner Tire and Mfg. Co., capital stock $10,000; to manufacture and sell rubber goods; incorporators, A. S. Spaugh, J. C. Dewes and M. W. Elkenberry.

New York—Autos Tri-Borough Co., capital stock $10,000; repair, garage and deal in motor cars; incorporators, E. J. Forhan, G. F. Martin and H. P. Jones.

Boston, Mass.—Empire Motor Car Agency; incorporators, Carl Fischer and James Allison.

Cleveland, O.—Owners Garage Co., capital stock $15,000; incorporators, F. H. Ginn and others.

Detroit, Mich.—Day Automobile Co., capital stock $300,000; incorporators, T. W. Day, Hugh Jennings, Cameron F. Roberts and Wallace E. Brown.

Manufacturers' Communications

AMERICAN TIRE SUCCESS

AKRON, O.—Editor Motor Age—The building of tires for American road conditions is no doubt in a large degree responsible for the success of American tires abroad. Necessity has compelled the working out of more advanced methods of tire construction in this country than are used in Europe, and the American product is fast gaining in popularity among European motorists.

Keith H. Goode, who lately took charge of the Diamond tire distributing establishment in Paris, says that the American invasion is making itself felt in every corner of the continent. One point in American tire construction to which the European car user has taken very kindly is the higher and thicker sidewall of the tire in contrast with those of the foreign product. In Diamond tires, for instance, the thicker rubber of the tread is carried up much nearer to the bead or clincher of the tire casing, largely for the purpose of resisting the strain and wear occasioned by ruts. This problem never was worked out abroad, because, perhaps, the more uniformly smooth and level roads never made such a desirable feature so apparent as in this country.

Large numbers of American motorists touring in Europe the past summer have commented upon the greater mileage given them by American-made tires than was obtained from tire equipment of foreign manufacture. Time was when America obtained some good ideas on tire construction from the European manufacturers, but there is every reason to believe that the latter have now been surpassed. They must come to America for more advanced methods than they are now using or fall behind in the tire business of their own markets.—Diamond Rubber Co.

MOTOR TRUCK ECONOMY

Akron, O.—Editor Motor Age—The business man who studies the economy of motor truck delivery is learning to realize the leading part that tires play in maintenance cost. This special attention to tires forecasts increasing popularity of the vehicle, for the neglect of tires has been one of the chief stumbling blocks in the past to the general adoption of this great business economy. Many a good vehicle has eaten its head off in tire expense that was utterly unwarranted and could have been prevented in the first place by shoeing the car with large enough tires of the right kind.

Every man who knows trucks knows that the greatest foes to their economy are persistent overloading and overspeeding. These strains fall especially hard upon the tires, owing to the peculiar qualities of rubber. The harm thus done to tires is so well recognized that some long-headed manufacturers discount it by equipping with larger tires than would be required under normal usage. Fortunately there is a growing disposition on the part of other truck manufacturers to become more particular and not lose sight of the future tire service for the purpose of saving a little on the first cost.

The Firestone company has turned away orders for many thousand sets of tires simply because our experience has shown that the tire equipment contemplated was too small. To have large enough tires is of paramount importance to the truck buyer, hence he should take advantage of his opportunity to specify his preference. It is absolutely essential that the tires in service be watched to detect and remedy any evidence of undue wear or misuse, for little injuries to rubber rapidly grow to big ones and a stitch in time saves nine. If only the rubber tires were a piece of mechanism which immediately stopped giving service when abused, the driver's attention would be at once attracted and the misuse be ended then and there. Unfortunately injuries to tires do not assert themselves but have to be hunted out and should be promptly remedied. In the case of side-wire tires minor repairs can be made by substituting a section of tire. This can be accomplished in a few minutes at almost any branch store. The more serious injuries are remedied by rebuilding tires with new material. The cost of this is small and is one of the best tire investments that can be made, as this repair frequently doubles or triples the length of service.—Firestone Tire and Rubber Co., J. F. Singleton.

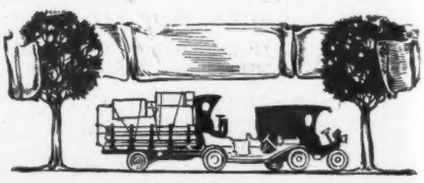
The Motorists' Bookman

"In the Catskills"

"IN the Catskills," by John Burroughs, is a collection of essays written by the naturalist, describing phases of farm life, the habits and haunts of birds, and the smaller animals. So sharp and clear are his descriptions that one in reading can fairly smell the odor of the pine and spruce, and hear the murmur of the trout streams that run through the district. These writings extend over 40 years and reveal Mr. Burroughs' persistent and intense love of nature. The scenes are mostly those surrounding the ancestral home of his boyhood. The graphic descriptions will appeal to the nature-loving motorist, helping him to discover otherwise an unseen beauty. The book is attractively illustrated with typical mountain and country scenes and makes reading that is interesting to many motorists. Houghton, Mifflin Co., New York, publishers.

"My Mark Twain"

A tenderly-written book of reminiscences, chronicling a friendship of 40 years, is "My Mark Twain," by William Dean Howells. These two men of letters, meeting in the office of the Atlantic Monthly in the first flush of success, formed a friendship, the close intimacy of which lasted until the end of Mark Twain's life, and it is this intimacy which makes the book of unusual value. The closing tribute by Mr. Howells emphasizes the value put upon Mark Twain's character and friendship: "Emerson, Longfellow, Lowell, Holmes—I knew them all and all the rest of our sages, poets, seers, critics, humorists; they were like one another and like other literary men; but Clemens was sole, incomparable, the Lincoln of our literature." Harper & Brothers, New York, publish the book.

"Dust Preventives"

"Dust Preventives and Road Binders," by Prevost Hubbard, is a 416-page volume from the press of John Wiley & Sons, New York. Mr. Hubbard is assistant chemist in the public road office of the United States department of agriculture and in presenting this book as a result of his experience in this work his aim is to furnish road engineers with a working knowledge of the characteristic properties of dust preventives and road binders now in use, and to develop certain fundamental principles relative to their selection and application. Some of the chapter titles are dust preventives and road preservation, classification of dust preventives and road binders, inorganic dust preventives and road binders, petroleum and petroleum products, tars and tar products, and methods of testing bitumious road materials.